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THE  
**Journal of the Society of Arts,**  
AND OF  
**THE INSTITUTIONS IN UNION.**

110TH SESSION.]

FRIDAY, DECEMBER 11, 1863.

[No. 577. VOL. XII.

**Announcements by the Council.**

**ART-WORKMANSHIP.**

The works submitted in competition for the Prizes offered by the Society are now placed for the inspection of members and their friends, in the Society's Great Room, where they will remain until Christmas, when, with the view of their being exhibited to the general public, they will be removed to the South Kensington Museum, by permission of the Science and Art Department.

Copies of the photographs and rough castings issued for competitors to work from are also shown.

The Council have requested Mr. Richard Redgrave, R.A., Mr. Digby Wyatt, M.R.I.B.A., and Mr. John Webb to act as judges in awarding the prizes, and these gentlemen will shortly meet to make the awards.

The Art-Workmanship Committee has been re-appointed, and is now engaged in the preparation of conditions for the next competition.

**INSTITUTIONS.**

The following Institution has been received into Union :—

West London Youths' Institute, Bayswater.

Wednesday evening Meeting previous to Christmas. Chair taken at 8 o'clock.

Dec. 16.—"On the Economic Value of Foods, having special reference to the Dietary of the Labouring Classes." By Dr. EDWARD SMITH, F.R.S.

Courses of Lectures (under the title of "the Cantor Lectures") on the following subjects, will be delivered during the Session :—

The Operation of the Present Laws of Naval Warfare on International Commerce. By G. W. HASTINGS, Esq., Barrister-at-Law.

Fine Arts Applied to Industry. By W. BURGES, Esq.

Chemistry Applied to the Arts. By Dr. F. CRACE CALVERT, F.R.S.

Mr. Hastings' course consists of four lectures, the first of which was delivered on Monday, the 7th inst. (See the next column.) The second will be delivered on

MONDAY, THE 14TH DEC., AT EIGHT O'CLOCK.

Subject--The Law of Blockade.

The subjects of the two concluding lectures, to be delivered after Christmas, are :—

Contraband; its Nature and Usages.

Capture of Private Property at Sea; present State of the Law as modified by the Declaration of Paris; Arguments for and against its Continuance.

The Foreign Enlistment Act; its Operation on Commerce.

The Michaelmas subscriptions are now due, and should be forwarded by cheque or post-office order, made payable to the Financial Officer, Samuel Thomas Davenport. All cheques and post-office orders should be crossed through Messrs. Coutts and Co.

**Proceedings of the Society.**

**CANTOR LECTURE.**

MONDAY, Dec. 7th.—THE LAW OF BLOCKADE.

Mr. HASTINGS, after some preliminary observations, said that International Law was of two kinds—public and private; the latter dealing with the international rights of individuals, the former regulating the intercourse of States, as political communities. As that intercourse was chiefly based on trade, it followed that the interests of international commerce were bound up with the development of public international law. This law came under two heads, as relating to peace and war. Passing by the first head, and coming to that which unfortunately occupied by far the largest space in the text books of publicists, the international law relating to war was again divided into that which related to war by land and that which related to war by sea. It was this latter which formed the subject of these lectures, and was much the more intimately connected with international commerce. It was possible to imagine war by land carried on without much interruption to commerce, but naval war struck directly and avowedly at trade, and was waged against peaceful property. Mr. Hastings proceeded to point out that international law lacks, to a considerable degree, the qualities of certainty and uniformity which distinguished municipal law, and that hence arose an ambiguity in writers on the subject against which it was necessary to guard, —a disposition to mix the ideas of what the law *should be* with what it *is*. This was the case with that part of the law which formed the subject of the evening's lecture—that of blockade; the French law of blockade, for instance, differing from the English, and English writers themselves varying in their opinions. He recommended for perusal the chapter on blockade in Dr. Travers Twiss' "Law of Nations," on the belligerent side of the question; Mr. Westlake's paper on "Commercial Blockades," taking the neutral view, and at the same time supplying a most learned and exhaustive history of the subject; and thirdly, those portions of Wheaton's "International Law"

(recently re-edited by the great American publicist, William Beach Lawrence) which deal with blockade. The purely continental view was of course to be sought in the writings of French international lawyers.

The origin of the law of blockade was not in the barbarous custom, once prevalent, of prohibiting all trade with an enemy's country, but in the belligerent rights necessarily attaching to a siege of a particular town. These rights, of course, included the forcible prevention of any intercourse with the place, whether by neutrals or belligerents. The usage, thoroughly recognised in this limited application, was first extended by the Dutch, who in 1584, and more explicitly in 1630, declared the various ports in Spanish Flanders under blockade. Thus arose the institution of commercial blockade, or the sealing-up of a line of coast, and of purely mercantile ports, against all commerce. The natural struggle of neutral and non-maritime powers to narrow the application of that law, led to the demand, now universally conceded, that blockades should be effective. But here came in the uncertainty of international law—What is an effective blockade? Mr. Hastings described the different doctrines held on this point, by the French and continental nations on the one hand, and the English and Americans on the other. He showed that the practice pursued during the great war with France was, on both sides, by Napoleon in his Milan and Berlin decrees, and by the British Government in their Orders in Council, opposed to the real principles of public law, and was in fact a return to the mediæval barbarism of prohibiting trade with an enemy's country. The wise and temperate course pursued by France and England in reference to blockade during the Crimean War, and the admirable judgments delivered at that time, were a guarantee that European civilisation had passed the possibility of such outrages; and the Declaration of Paris, in 1856, indefinite as its terms may be, had given an international embodiment to that enlightened policy.

#### FOURTH ORDINARY MEETING.

Wednesday, December 9th, 1863; John Grey Esq., of Dilston, in the chair.

The following candidates were proposed for election as members of the Society:—

Attwood, Matthias Wolverley, F.R.G.S., Dulwich-hill, S Bowyer, Rev. W. N. Wentworth A., Rectory, Clapham common, S.  
 Brown, Henry, Ettrick Mills, Selkirk, N.B.  
 Cotton, Charles P., 11, Lower Pembroke-street, Dublin.  
 Cutler, Joseph, 4, Pollington-villas, Holloway-road, N.  
 Ellis, Wynn, 30, Cadogan-place, S.W.; Ponsbourne-park, Hertford; and Tankerton, near Canterbury.  
 Forbes, H., 6, Aberdeen place, Maida-hill, W.  
 Hanson, Reginald, 43, Upper Harley-street, W.  
 Hardwicke, Robert, 192, Piccadilly, W.  
 Johnson, William, 188, Tottenham-court-road, W.  
 Kiessler, T., 18, Spencer-street, Goswell-road, E.C.  
 Lumley, Henry, 4, Guildford-place, Russell-square, W.C.  
 Maynard, Henry, Oakfield-lodge, Hawkhurst, Kent.  
 Mercer, Thomas, 45, Spencer-street, Goswell-road, E.C.  
 Needham, John, Albert Iron Works, Warrington.  
 Nicholson, W. W., 17, King-street, Cheapside, E.C.  
 Shand, James, Upper Ground-street, Blackfriars, S.  
 Southorn, Edwin, Broseley, Salop.

The following candidates were balloted for, and duly elected members of the Society:—

Aldridge, Major, 17, Cadogan-place, S.W.  
 Austin, Albert Duncan, Nelson, New Zealand.  
 Austin, Henry de Bruno, 34, Up. Hyde-park-gardens, W., and Castle-hill, Ealing.  
 Azémard, J. C. 40, Mark-lane, E.C., and The Waldrons, Croydon, S.  
 Baker, Charles, 15, St. Petersburgh-place, Bayswater, W.

Bulwer, William Earl Lytton, 24, Portman-square, W.  
 Burney, G., Tank Factory, Millwall, E.  
 Burt, John Mowlem, Grosvenor-house, Millbank, S.W.  
 Campbell, James, 6, Founder's-court, Lothbury, E.C.  
 Carrington, S. R., Stockport.  
 Cookson, Wm. Strickland, 6, Lincoln's-inn, W.C.  
 Corderoy, John Kittle, 8, Chester-place, Kennington-cross, S.  
 Crowther, Benjamin, Queen-street, Wakefield.  
 Fort, Richard, 24, Queen's-gate-gardens, W., and Reedhall, Clitheroe, Lancashire.  
 Haigh, Henry, Holme Vale Dye Works, Milnsbridge, near Huddersfield.  
 Hamel, Felix John, Custom-house, E.C., and Church-street, Stoke Newington, N.  
 Hancock, George, 36, Carey-street, Lincoln's-inn, W.C.  
 Lancaster, George, 50, Hanover-street, Islington, N.  
 Le Rendu-Hamilton, E., 3, Alma-ter, Kensington, W.  
 Lister, Thomas Villiers, 61, Eaton-square, S.W.  
 Marct, Dr. William, F.R.S., F.C.S., 1, Torrington-street, Russell-square, W.C.  
 Turner, James William, F.R.C.S., 30 and 31, Lower Phillimore-place, Kensington, W.  
 Voelcker, Augustus, 101, Leadenhall-street, E.C.

AND AS HONORARY CORRESPONDING MEMBER,  
 Merlato, Le Commandeur G. G., Consul de S. M. l'Empereur d'Autriche à Tunis.

The Paper read was—  
 AGRICULTURAL PROGRESS: ITS HELPS AND HINDRANCES.

By J. CHALMERS MORTON, Esq.

It is the object of this paper to illustrate the fact of agricultural progress—to specify the circumstances by which it has been promoted—and to enumerate some of the obstacles by which it has been hindered. A discussion of the helps and hindrances amidst which it has been accomplished ought to be of service to it in the future; and it is as an introduction to such a discussion that the following statement has been prepared.

First.—Of the fact that great progress and improvement have been witnessed in our agriculture during the past quarter of a century.

This is just the period during which I have been in the ranks, and as, during the past 20 years, it has been my weekly occupation to narrate particular examples of agricultural improvement, and to record the circumstances to which they have been owing, it may be thought an easy thing for me to prove and illustrate the general agricultural progress which has thus been made. On the contrary, it is an extremely difficult thing to do so in any satisfactory manner.

For agricultural progress, if of any interest or value whatever, simply means more food produced per acre, and of our food produce we have no statistics.

#### IMPORTS AND SALES.

Such records as we possess do indeed appear at first to deny the existence of any such progress as is asserted. Certainly they prove that our agriculture is now farther short of supplying us with the food that we consume than it ever has hitherto been. The annual import of wheat and flour of wheat, reckoned together, which amounted in 1845 to 1,142,000 quarters, and in 1846 to 2,340,000 quarters, varied between 3 and 5 millions of quarters per annum between 1847 and 1859. In 1860 it exceeded 7,000,000, in 1861 it exceeded 8,000,000, and in 1862 it amounted to 11,528,445 quarters—more than ten-fold what it was in 1845. And the annual importation of other kinds of grain and meal has also increased during the same period. Varying in general from 4 to 5 millions of quarters between 1846 and 1859, it exceeded 7,000,000 in 1860-61-62.

These last three years have, we know, been very unproductive in this country, but even if we disregard the ex-

cessive importations of these three years as altogether exceptional, there remains the fact of an enormous, and, on the whole, increasing dependence on foreign supplies during a long series of years before. And this, I say, appears at first to be incompatible with the idea of any great agricultural progress at home.

There has been no corresponding increase in the quantity of meat or in the number of cattle and sheep imported. The number of oxen has varied irregularly during the past 15 years between 60,000 and 100,000 per annum, and that of sheep and lambs between 130,000 and 300,000 per annum without much indication of an increased importation year by year. Nor have the imports of bacon, beef, and pork materially increased except during the last two years. But, admitting that we are not on the whole so increasingly dependent on foreigners for our meat as we are for our bread, it must be remembered, on the other hand, that the prices of our home-produced meat have been gradually rising. The best fat Hereford oxen were sold for little more than 5d. per lb. 18 or 20 years ago—they are now worth nearly one-half more. Mutton, in like manner, has risen from 6d. to 8d. and more per lb. And from this, as from the increased importation of grain, it does not at first appear as if the agricultural progress which we boast meant an increased produce of food. I need not refer in detail to those importations which supplement the produce of particular districts; but these, too—the imports of butter, cheese, and eggs—exhibit in an even greater degree the increasing deficiency of our home supplies.

And there is yet another set of figures which, taken for what they are worth, seem even more to throw doubt upon the assertion that our produce per acre is increasing. In order to determine from year to year the value per quarter of those quantities of wheat, barley, and oats, into which the tithe has in every parish been commuted, it is provided by law that a record be kept in all the principal English market towns of the quantities and prices of wheat, barley, and oats sold on every market day throughout the year. There is a certain, and if we might suppose an unvarying degree of obedience paid to this law, then the amounts thus declared to have been sold would bear a constant proportion to the quantity of grain sold throughout the country, and they would fairly indicate the varying produce of our crops from year to year. That they do to a certain extent represent the productiveness of the year appears from the fact that they do rise and fall with the admitted character of the harvest. Thus, the quantity of wheat recorded as sold, which is generally about 5,000,000 quarters per annum, was, in the unproductive years of 1860, 1861, and 1862, 4,600,000, 4,289,000, and 3,588,000 quarters respectively. But what is noteworthy, if it can be at all taken as indicating the general productiveness of the country, is that the largest quantity recorded since 1844 was 6,666,000 quarters, sold in 1845; that the quantity was somewhat under 5,000,000 quarters per annum from 1844 to 1854; that it was somewhat over 5,000,000 quarters per annum from 1855 to 1859; and that it again, as already said, fell considerably below 5,000,000 quarters per annum during the past three years. Certainly there is no indication here of increasing annual productiveness. And the sales of barley and oats, similarly recorded, are equally unsatisfactory to those who would naturally hope to see in these records some indication of the increasing productiveness of our arable lands.

Of course the great majority of those who examine these figures, will find for themselves some explanation of them that is consistent with the belief which will be retained that our agriculture is nevertheless greatly more productive than it was.

Every countryman can point to so many instances of agricultural improvement within his own knowledge that, whatever the explanation be, he knows there must be some way of reconciling these figures with the fact of which he is certain, that land upon the whole produces now much more than formerly.

But before I proceed to justify this belief by marshalling the evidence on which it rests, it is right that we should be aware that it has been always possible to lead a proof by instances and examples of the productiveness of English agriculture.

Listen to Mr. Thompson, of Kirby Hall, near York, who, as President of the Yorkshire Agricultural Society, had last year to review the agriculture of the 20 years during which the society which he had helped to found had been in operation. He said that he had been a constant attendant at the shows of that society, and a very frequent one at those of other societies, and he was confident that the prize animals shown by Lord Spencer, Messrs. Booth and Bates, and others, in the early days of the society, were as good in every respect as those shown by Col. Towneley, Mr. Fawkes, Lord Feversham, and other noted breeders of the present day, and the same might be said of other classes of stock. Then as to the crops—it was usual 20 years ago to grow five quarters of wheat per acre, and not uncommon to grow six. Occasional instances could be found where the produce had been greater still, and he had yet to learn that they could do more now. The best cattle and the best crops are no better now than then.

It is plain, therefore, that though I were to bring before you hundreds of examples of productive farming in operation now, yet as I should be doing no more than another might have done with equal force 20 or 30 years ago, I should not thereby establish the advance which I believe has been made during the interval. Although therefore I shall refer to one or two particular instances of the progress which has been accomplished, yet it will be rather by a collection of testimonies from land agents and tenant farmers in different parts of the country, of the general condition of the land as to productiveness now and 20 or 30 years ago, that I propose to prove the general progress which has been asserted.

#### DISTRICTS OF STATIONARY FERTILITY.

Of some districts I suppose this progress cannot be asserted—their produce has not increased. Thus I have before me a curious table, giving the produce of wheat on a large fen farm in Lincolnshire, from 1839 to 1862. The average produce of the wheat harvest during that period has been close on 39 bushels per acre—but it has varied irregularly between 44 and 24 bushels, without any indication whatever of a gradually increasing fertility. The produce per acre runs thus in bushels per acre in successive years:—34, 40, 35, 43, 38, 48, 32, 41, 42, 43, 44, 28, 45, 47, 41, 45, 26, 47, 48, 40, 26, 24, 27, 34. These four last being the produce of 1859, 1860, 1861, and 1862.

“ You will see,” says the tenant of this farm, “ that we are not at all improving in the yield of wheat, which is the great staple of this district. The oat crop has been more productive than formerly, or we should have been worse off, and stock have left more profit than usual, but with those helps I never knew three consecutive years so bad as 1859, 1860, and 1861. The rents generally have been raised from 5s. to 10s. per acre during that period.”

Another correspondent in the same neighbourhood, speaking of the meat produce of the fens, says:—

“ I should think the amount of meat produced, and the quantity of live stock kept in the Fens, has decreased rather than increased during the last 15 or 20 years. Since railway facilities have been afforded, a good deal of land has been employed in the production of potatoes, carrots, &c., for the London and Birmingham markets. Some of these crops, on land suited to their cultivation, have realised good prices per acre, and have been as paying and profitable as the grain crops.”

Another district of stationary agriculture, or rather class of districts it may be called, includes all those richly manured suburban holdings which around our large towns are cultivated rather as market gardens than as farms, and which have always been maintained in the highest state of fertility. If we except some considerable tracts

of light land which have long been well farmed, where, as Mr. Hudson, of Carthen, says, they have been in the same "rut" for a quarter of a century, consuming, on a single tenancy, £2,000 or £3,000 worth of oil-cake, and using £1,000 worth of artificial manure per annum, and where the land, therefore, has not much capacity of additional improvement in it, these are probably the only large tracts of land in the country of which no progress is reported, the one owing to the high degree of fertility which drainage and marling had at once conferred upon it, and the other because of the high artificial fertility which it has always possessed.

#### TESTIMONIES TO PROGRESS.

Now for the large remainder. Beginning in the North, I would state generally there cannot be a doubt that it, more than any other part of the island, has benefited by the importation of guano and the manufacture of artificial manures during the past 20 years. It has also benefited as much as any other part of Great Britain by the extension of drainage and of deeper tillage, and by the improvement of stock.

Thus Mr. Simpson, of Beauly, Inverness, says the live stock on the waste land of his district has increased one-half during the last 20 years. Mr. Fraser, of Culloden, says during the past 20 years great improvements have taken place. Waste land has been brought into cultivation, and old land has been drained, and in many places the face of the country has been changed. Though the gross produce has increased, yet the produce of the best land has not altered. Rents, however, have greatly advanced. Mr. McCormack, of the vale of Alford (Aberdeenshire), says, "within the past 20 or 30 years rents have greatly increased. Railways have been introduced. Wages have risen 75 per cent. Much land has been reclaimed; much land has been furrow-drained and made fruitful." Mr. Drennan, of Ayr, has in like manner given me an elaborate report of the alterations and improvements in his county, and of the share taken in them by the agricultural societies of the country. To this I shall refer again.

Except that it does not mention the increased growth of the potato crop, by means of which such enormous rents are paid in many parts of Scotland, and by which a largely increased produce of food has been obtained, the following report by Mr. McLean, Secretary of the Wigtown Agricultural Society, and specially descriptive of the county of Wigtown, will apply to many other districts:—

"During the last 20 years there has been a remarkable advance made within the bounds of the society, particularly in the cultivation of green crops, and the feeding of cattle and sheep for the English markets, to which ready means of access have been, during all that period, afforded by our excellent iron steamer (the *Countess of Galway*) plying regularly between the ports of the district and Liverpool, and for the last two years and a-half by the Portpatrick Railway Company. In many farms the dairy system (with Ayrshire cows) has been successfully introduced. I believe that the improvement of the district has been mainly owing to the introduction of imported manures (chiefly bones and guano), and the consequent increased extent of green crops and ready means of conveying fatted stock to the English markets."

In Berwickshire Mr. Wilson, of Edington Mains, reports thus of the improvements during the past 20 or 30 years. After referring to the great extension of land drainage during the past 20 years, he says:—

"When I began farming, exactly 34 years ago, the application of bone dust as a manure for turnips was just getting into general use in this district and the slicing of turnips for hoggets was then unpractised among us. In 1830 or 1831, I happened to procure a turnip-slicing machine from one of the Midland Counties of England, which—so far as I have been able to find out—was the first that was used by a tenant farmer in this county. In a very few years after that date the universal use of bone-manure caused an immense increase of the acreage annually under turnips, and also of the weight of produce per acre. The general adoption of the practice of slicing turnips

for hoggets soon after changed our whole system of sheep management. Our hoggets began to be sent to market as soon as they were shorn, say at 15 months old, instead of being kept until about two years old, as had been the previous practice. The use of bone-manure produced nearly as great an improvement upon the seeds as upon the turnip crop to which it was directly applied. This increase of the green crops and earlier marketing of the hoggets produced of course a greatly increased demand for lambs, and thus led to corresponding changes of practice on the upland sheep farms, from which the supplies of store sheep were drawn. Instead of an annual crop of two or three years old wethers of the pure Cheviot or Blackfaced breeds, they began to cross their ewes with Leicester rams, and sold these cross-bred lambs at weaning time to the Low country farmers. The command of portable manures has enabled the occupiers of these up-lying farms to bring much additional land under tillage. This process is steadily extending; and as it does so, the command of green crops thus obtained is regularly accompanied by a change to a sheep-stock of a more valuable class. All these practices date earlier than 20 years ago; but they have been greatly extended and developed since then. The introduction of pipe-tiles for draining, and of guano, nitrate of soda, and bones in the form of superphosphate as manures, has supplied great additional facilities for all this. Until thirty years ago linseed-cake may be said to have been unknown in this district. About that time it began to be used in the rearing of calves, and gradually a good many farmers began to give a little of it to their fattening bullocks for a short time before sending them to market. Now cakes of various kinds and other farinaceous feeding stuffs are in general use for the fattening both of sheep and cattle. The trade in these articles and portable manure has here as elsewhere grown to an important branch of business. Thorough draining, portable manures, artificial feeding stuffs, are now trite expressions; but when it can be reported of a district or county that all of them are included—less or more—in the cultivation of very nearly the whole of its farms, it is superfluous to add that a very great increase of produce has been the result. It has been said that every cwt. of guano applied to our farms is equivalent to the importation of a sack of wheat. Whether this be a strictly accurate statement or no, there can be no doubt that green crops, live-stock, dung, corn, is a true sequence in agriculture, and that an increase of the first item really means an increase of all the rest."

Coming further south, I have the following excellent report from Mr. Stephenson, of Fourstones, near Hexham:—

"I think no change which has taken place in the farming of this district since 1840 will so much strike the practical farmer as the increased quantity of turnips grown, and, as a natural consequence, the very large extension of sheep-feeding. The general management of the district has so wonderfully improved, from the cause I have stated, that anyone will at once perceive from what cause arises the increased value of land. The introduction of leases with clauses for unexhausted improvements has aided no little towards our progression, and I still hope to see enterprising tenants more liberally dealt with, which I think will be one of the best ways of giving birth to future and permanent improvements. The much earlier period at which sheep and cattle are brought to market must not be overlooked, for not only is this one of the most interesting parts of farming, but it possesses the additional advantage of bringing a quicker return for the outlay of capital. Perhaps one of the most striking, and, in its results, one of the most beneficial improvements that has taken place in this district is the greatly improved method of conducting our harvesting operations; reaping corn is entirely done by machinery and short scythes, and the beautifully low and even cut fields present a pleasing contrast to the knee-deep stubbles of 20 years ago. Nearly the whole of the district has been thoroughly drained, and pipe tiles have taken the place of the old stone drains. In summing up improvements since 1840, we notice the general management of the district wonderfully improved; the extension of green crops, which has greatly enhanced the value of land; the greatly increased number of sheep and cattle reared, and the much earlier period at which they are brought to market—the improved method of cutting corn and harvesting in general—the improvement in agricultural implements—the success which has attended thorough draining, and the introduction of farm leases with clauses for unexhausted improvements. The high rate of wages which the agricultural labourer receives is to be attributed in a great measure to the demand for labour at the lead mines and collieries. Hinds are receiving from 15s. to

17s. per week, with privileges which cannot be less than 3s. per week. They are energetic and persevering, show much skill in the several departments of the farm, and readily learn the working of any new implement. There are now good schools in every parish, and as many of the men are receiving an income of £50 per annum (independent of the money earned by their wives and families), it will be seen they have every chance of giving their children a sufficient education."

It is in this district that the Greenwich Hospital estates lie, which have for so many years been under the management of our Chairman—during which time the interests of landlord, tenant, and labourer, have alike prospered. An additional £10,000 a year as rent is now remitted to the landlord—the arrears are *nil*—cottages are improved, and wages are increased. And of course all this has come out of the increased produce of land.

"The increased produce," says Mr. Gray, "consists more in root crops and the amount of stock kept, than in corn, although the crops of corn have also partaken of the benefit of better cultivation. The total increase upon farms where thorough draining and deeper cultivation are practised, must at least be one-third; in some instances it is more, but that is not yet apparent in the rents, for it is only obtained by a greatly increased expenditure by the tenant, in extra manuring and cultivating; and, besides, the value of the improvement is not found by the landlord till the end of the lease. All such increased outlay by tenants contributes no doubt to the welfare of the labourers, whose condition in this county has been greatly improved during the last 30 years, by the general improvement of their dwellings and advance of wages."

I have a very interesting report from Mr. Sweeten, the Hon. Sec. of the Penrith Farmers' Club, of the improvements which during the last 20 years have taken place in Cumberland and Westmoreland. Rents have risen some 15 per cent., wages have risen 25 per cent.; the live stock of the locality has improved, and the extension of land drainage, and the increased use of artificial manures and feeding stuffs, have added materially to the produce of the land.

Hear now the following valuable account of North Lincolnshire improvements, by Mr. Sowerby, of Aylesby:—

"The improvement in farming in North Lincolnshire has been very progressive for the last 30 years and upwards. I dare say you are aware we farm almost altogether on the four-course system, turnips, barley, &c., seeds, and wheat, the turnips for the most part fed off by sheep with a liberal allowance of oilcake. This management, with a good quantity of oilcake used in the fold yards, will always insure improvement in land. Half inch bones to a great extent are used for the turnip crop, and perhaps to a greater extent 20 years ago than they are now. Superphosphates have taken their place a good deal of late years; and of course that is the same thing, but not so lasting. Good crops of roots fed off by sheep are the great improver of land, and moreover what enables us to pay our rents; for nothing pays like sheep. A considerable extent of land in this part of Lincolnshire, termed the "Middle Marsh," that is, land lying from the foot of the Wolds to the marshes adjoining the sea and Humber, required underdraining, which, to a great extent, was done about 20 or 30 years ago about two feet deep with sods and bushes. That improved the land very much, and paid well for doing. Those drains of course after a time failed, but still lasted nearly 20 years when done well. For the last 10 to 15 years draining has gone on upon that land with pipe tiles put in from 3*1/2* to 4 feet deep. This district of country is likewise farmed upon the four-course system, just as the Wolds. A good deal of this was ordinary grass land, a good deal of which is ploughed and makes good corn land. I have myself taken up nearly 300 acres, the last 20 years, upon Aylesby farm. In addition to growing so much more corn, the same land will keep a great deal more stock. At the first glance you hardly could believe that. Bear in mind that though it is inferior grass land, it becomes the best of corn land, growing good root crops, and keeping a great deal of stock. I have been 40 years at Aylesby, and I think I speak within bounds when I say I have grown double the quantity of corn and kept double the quantity of stock this last 10 years than I did the first 10 years I was a farmer, though of course I have been at considerably more expense. For the most part we have liberal landlords, particularly our larger landed pro-

prietors. Wages are good; the lowest I gave last winter was 13s. 6d. per week, and this winter I dare say will be the same, though perhaps in many instances they may be down to 12s. for our common labourers. We do a good deal of work by the piece. I shall not grumble if my men that are draining earn 20s. per week, which I daresay they will do."

In the neighbourhood of Grantham, Mr. Charles Beasley, of Harston, informs me—

"There has been a very marked improvement in this district during the last twenty years, both in the quality of the stock bred and in the management of it, especially in the eating off of turnips with sheep. The great majority of farmers are now cleaning their turnips, cutting them up, and using large quantities of dry food with them, which has very much mitigated the prevalence to disease, which was a very serious impediment to successful sheep keeping in this neighbourhood."

Let us now cross to the dairy districts of Cheshire. Mr. Palin, of Stapleford Hall, near Tarvin, writes:—

"Great progress has been made in this county within the last 20 years; the increase of stock, both in cattle and sheep, is very considerable; in some instances nearly doubled, and this arises principally from the great improvement of our clay land pastures by the use of bone manure, by draining, and a more extensive cultivation of green crops, although it would be difficult to show by figures, with any great accuracy, the amount of such increase, either as regards cattle, sheep, or cheese, in consequence of the great changes in stock, from cattle to sheep and *vice versa*; and also an increase of tillage occasionally on many of our farms during that period caused by that dreadful scourge, pleuro pneumonia."

From the same county Mr. Rigby, of Fenny Wood, Winsford, also writes:—

"The most decided improvements observable in the last 20 years have been seen in draining and boning grass lands. The principal product of this county, as you are aware, is cheese, and the quantity of this commodity has been quite doubled by the application of bones on the pastures and of draining, although there is yet much of the latter to be done. I know many farms that used only to keep 40 cows ten years ago that now milk 80, and one farm which then kept 60, has now 140 milking cows on it, besides other stock, and this has been effected principally by these means; the stock, too, are better kept in the winter than formerly, and come to calve in much better condition, and as a consequence give better results."

I must not fatigue you with the multitude of witnesses who might, if there were time, be brought into Court, and I shall quote only a few more.

Mr. Howard, of Bedford, writes as follows:—

"The great improvements in cultivating the land during the last 20 years are almost confined to clay land; our light lands were farmed almost as well 20 years ago as now. Thousands of acres of clay have during this period been underdrained thoroughly with tiles; the growing of summer feed, such as tares, is extensively practised; the growing of mangel is a great boon; summer fallows are almost abolished; and the live stock kept is greatly increased—indeed, some of what were considered poor clays grow our best barley, and will, with the aid of steam, be worth as much as the light lands. I cannot give you any instances of produce, rent, or wages, but all have risen, the produce and rent in the larger proportions; still the introduction of piece-work has greatly benefited the labourer, and day wages have increased from 9s. to 11s., and from 10s. to 12s. per week, according to which side of the county I take."

This is in keeping with reports from Norfolk and from Essex. The lighter lands of the former county, which do not need drainage and have long been liberally treated with artificial manures and well fed stock, have not such capacity of improvement in them as the heavier undrained soils of Essex, from which county we have reports of improved tillage, extension of root crops, diminished bare fallow, and improved crops upon clays improved by land drainage and by deeper and better tillage.

Let us now travel to the end of our story by the other side of the country. Mr. Bowley, of Siddington, near Cirencester, has given me an elaborate and most satisfactory report on the advantages of drainage, artificial manures,

and improved machinery, as exhibited in the Cotswold district, where improved root crops, improved cattle and sheep, and better grain crops, have all increased the produce of the district.

Mr. Holborow, the Secretary of the Tetbury Farmers' Club, says of this district:—

"In the growing and management of root crops the improvement is very marked—autumn cultivation, drilling, horsehoeing, the liberal use of artificial manures, securing the root crops in heaps covered with earth, being pretty general. In live stock the improvements may be said to consist in a greater quantity being kept of an improved sort, earlier maturity and quicker preparation for the butcher being to a considerable degree manifested. The consumption of corn and oilcake by cattle and sheep is also largely increased, and the consequent effect on the crops of corn (coupled with better and more liberal management of the land generally) is patent to every one. The better employment (and payment too) of the labouring population is one happy result; their most respectable and comfortable appearance being very apparent, even though, alas, their cottage accommodation has not kept pace with other things, whilst their better education adds to the necessity and desirability of this. However, there is one class whose material interest has certainly kept pace with the other subjects of improvement, viz., the landlords, in a considerably augmented rent roll."

Mr. Rich, of Didmarton, adds:—

"As an illustration of the advance of agriculture in this neighbourhood (part of the Cotswold hills) witness the improvement of live stock; the steer is now frequently made fat at about  $2\frac{1}{2}$  years old; the sheep, which formerly arrived at maturity at  $2\frac{1}{2}$  or perhaps 3 years, is now the same weight, and frequently too heavy for the butcher at 1 year and 2 months old, yet wintered in the open field on roots, &c., leaving the richest manure where it is at once required."

I add a report from Wiltshire. Mr. George Brown, of Avebury, writes as follows:—

"The improvement in the cultivation of the soil is very great; a much greater abundance of stock is kept and brought out at a much earlier period, as regards age, and very much higher in condition, consequently much more valuable. Admitting this to be correct, I consider the great improvements in the cultivation of the soil and in the increase in stock, and condition in which they are brought to market, is at so great a cost to the farmer, as to leave a very small profit to him at the end of the year, but, on the other hand, it is a great advantage to the community at large."

Mr. Scott Hayward, of Folkington, Sussex, speaking of the light land and down district of the county, says:—

"The disposition to break up down land is increasing every year, and a very large extent has been brought under cultivation in the last 20 years; the use of artificial manures has increased to an immense extent with the breaking up of this description of land, and also the consumption of purchased artificial food (chiefly oilcake); the result of which is a larger quantity of sheep kept, and much better kept than formerly, no doubt gradually increasing in size,—a much larger produce of corn, and a much larger employment of labour. The use of bought cattle food has also greatly increased upon the poor and second class low land pasture farms, cattle and sheep being now fattened upon this description of land, by this means, that formerly only kept them in fair growing condition. Oilcake is also now used very generally in keeping store cattle in the winter in yards upon straw or hay; formerly this description of stock was merely kept alive through the winter, and frequently to be seen going down to the marshes in the spring very little more than skin and bones. Latterly, by the use of oilcake with the fodder, poor stock is seldom to be seen. The great and gradual increase in the use of artificial manures, and the consumption of bought cattle food is the most important feature in the recent history of Sussex farming."

Mr. Benson, of Tavistock, speaks of the vast advancement made in his locality during his acquaintance with it.

The following report from Hampshire, by Mr. Blundell, of Southampton, must conclude my quotations:—

"I offer you my estimate of the progress of the farming of our district, in a tabulated form, as the result of close observa-

tion since I have occupied my farm, for 32 years past. I estimate as follows:—

CROPS.			1843 to 1863.	
	1840 to 1843. Average produce per acre.	1860 to 1863. Average produce per acre.	Acreage grown.	Quality.
Wheat	24 bush.	29 bush.	incr. 25 per cent.	no improvement.
Barley	28	32	decr. 20	deteriorated.
Oats	34	42	incr. 10	improved.
Beans	24	26	incr. 10	no improvement.
Peas	22	24	incr. 10	no improvement.
Rye for feeding	...	...	doubled.	...
Tares ditto	...	...	doubled.	...
Grasses for hay and feeding	...	...	decr. 25 per cent.	no improvement.
Swedish turn- ips	13 tons.	16 tons.	decr. 20	deteriorated.
Common turn- ips	12	15	incr. 5	deteriorated.
Mangel wurtzel	18	25	incr. 15	improved.
Cabbages, car- rots, kohl rabi, &c.	15	20	incr. 10	improved.

Live Stock		1843 to 1863.
Horned cattle, fattened	...	double the number.
Dairy cattle	...	increase 10 per cent.
Calves raised for dairy purposes	...	" 10 "
Calves raised for fattening purposes	...	" 30 "
Value of cattle raised at two years old	...	" 16 "
Sheep stock for breeding purposes	...	" 25 to 30 "
fattening purposes	...	" 50 "
Value of sheep stock of all ages	...	" 20 "
Swine of all ages	...	" 30 "
Value of ditto	...	" 10 "
Horses for farm work	...	no increase.
Value of ditto	...	increase 15 per cent.

Great losses by diseases unknown before 1840 have been reported of cattle and sheep.

In the above attempt to tabulate this information, please observe that I make no reference to actual prices, as they may vary, but in speaking of value I take the real or improved value; with regard to produce, I only allude to increased production, and not to variation of crops. In speaking of increase of live stock, I make no allowance for losses by disease; they have, however, been enormous, past all calculation, and the improvement both in number and quality of sheep and cattle must have very far exceeded my present estimate had they been as free from disease as previous to the year 1840. In speaking of root crops, such as Swedes and turnips in particular, deterioration in feeding quality has gone on, consequent upon repetition of the crop and the application of stimulating manures. The value of land has been raised in rental since 1843 from 4s. to 6s. per acre, and may be attributed to various causes, amongst which are the commutation of tithes, the competition for farms by parties who require a healthy and pleasant pursuit, and by those who possess capital for which an investment is required; and there are applicants for farms resulting from the scientific education of young men for the business of farming. The actual returns, as profit for investment on the farming account, do not warrant the increased rental above alluded to. The quantity of land absorbed by railways, and the public works of government and companies of various kinds, and the increase of towns, has taken more land out of the market for occupation than has been supplied by recent enclosures. Although the recent enclosure act has facilitated the enclosure of waste and commonable lands, yet much more may be done in this respect."

I have thus collected a number of testimonials and opinions from practical farmers and land agents of long and large experience in various parts of the country, all concurrent to the effect that the agricultural produce of this country is now much larger than it has ever been before, that the fertility of the land is increasing, and that both in bread and meat of home produce we are really better off than formerly, notwithstanding that our imports of food have also largely increased, in order to supply our better fed and larger population. All this might have been as well illustrated though not better proved by a number of definite instances of improvement. I have, however, preferred the other plan of putting the fact before you, for one

reason among others, because I believe that the somewhat indefinite, and even the almost inarticulate judgment of an experienced man is, after all, more trustworthy than the precise figures which might be given in an account of individual examples. In agricultural questions, where everything is so dependent on circumstances, I would rather have the round numbers of a generally observant practical man than the decimals to the third and fourth place of an enthusiast on any particular point. And I think the body of testimony from which I have now read specimens is conclusive of the fact of agricultural progress. I should like, however, to add one reference to a particular example. If our Chairman can say that during his management of the Greenwich Hospital Estates £100,000 had been spent in land improvements, and many hundreds of cottages have been built, and largely increased rents have been obtained, and the tenants are in better circumstances, and the land is more productive, so that every class connected with it is benefited—so also can many an owner of land in the south. I will particularly mention the Sarsden estate in Oxfordshire, because it enables me to pay a tribute to the memory of one in whom English agriculture has lately lost a public-spirited exemplary and energetic friend.

During the late Mr. Langston's ownership of Sarsden—an estate of small extent compared with those of the Greenwich Hospital—£60,000 or £70,000 had been spent in the various estate improvements, which include the soil and its live stock, its roads, fences, buildings, farm-houses, cottages, and school-rooms. No part of the interests of landowner, tenant farmer, or labourer had been neglected. And the result is seen here, as in a multitude of other less definite examples throughout the country, in greater produce and a better-conditioned agricultural population.

#### CAUSES OF AGRICULTURAL PROGRESS.

Admitting, then, as proved, the increased produce of the country, what, let me ask, has it been owing to; and first, not of the original, but of the immediate causes of it.

1. It has been owing first to better tillage. The object of tillage is the creation of an increased available surface within the soil, on which may be prepared and deposited food for plants, and over which the roots of plants may feed. The greater the quantity of this internal superficies to act as a laboratory, as a warehouse, as a pasturage, and the better stored it is, under a given extent of land, then so long as the fitness of the mechanical condition of the land with reference to particular plants is preserved, the more fertile is that land with reference to those plants.

In order to the creation of this inner surface a greater depth of soil is stirred, and clods are comminuted. In order to the increased accessibility of this inner surface land is drained. The air and rain water which then traverse soil and subsoil instead of merely lodging in them introduce substances into this warehouse and activity into this laboratory.

The air which rain-water thus draws through the soil as it sinks downwards to the drains is as necessary to the fertility of the soil as it is to the heat of burning coals. The fire will merely smoulder until, by the erection of a chimney over it, a current upwards through the burning mass is impressed upon the air. And even then, in fires of caking coal, the heap may smoulder until, by the smashing of the fuel, that inner surface of the fire, where the action of the air takes place throughout it, is multiplied, and the impervious ceiling—or floor, as we might call it, to an upward current—which has hindered the passage of the air over that inner surface, is broken up.

Land drainage is the provision of a passage for the rain water, along with which the fertilising air has thus a downward current given it through the soil and subsoil. And tillage, especially tillage by steam-power, which does not cake a floor, as horse-power does, beneath the soil it stirs—has all that enlivening effect of the poker on a caked coal fire, which the parallel suggests. Extended drainage has a great deal to do with our increased pro-

duce. Mr. Bailey Denton estimates that nearly 2,000,000 acres have within the past 15 years been under-drained, and the fertility of these acres has no doubt been largely increased.

Deeper and better tillage has contributed to the same result. The extension of autumnal tillage is an undoubted fact; the enormously increased use of implements of the grubber class is another; the general adoption of a better form of plough is a third; the more general adoption of the fertilising practice of burning clay soils is a fourth. The success which has at length rewarded unconquerable perseverance in the attempt to use steam-power for tillage operations, is another great fact, which, if it cannot yet be quoted in explanation of agricultural progress hitherto, will unquestionably be looked back upon 10 years hence as having contributed largely to the increased fertility which will then have to be recorded.

2. In the second place our agricultural progress has been owing to the greater richness of home made manures, and to the greater use made of imported fertilisers. The imports of guano since 1840 have amounted to 3½ millions of tons; the imports of cubic nitre, which averaged 10,000 to 14,000 tons per annum up to 1858, have since varied from 25,000 to 40,000 tons per annum. The imports of bones since 1848 have increased from 30,000 to 70,000 or 80,000 tons annually. All these are manuring substances. Dr. Voelcker informs me that 75,000 to 80,000 tons of Suffolk and Cambridgeshire coprolites, and 15,000 to 20,000 tons of Sombrero phosphate, are also used in the superphosphate manufacture, which now probably exceeds in worth £1,000,000 per annum. To facts like this we have to add the enormous extension in the use of oil cakes and richer foods in the meat manufacture, by which the richness of home made manure is increased. The increased adoption of the practice of applying manure at once to the land, instead of rotting it in heaps, is an economy, and so an addition to our resources worth naming. The increased practice of feeding and collecting manure under shelter is another economy. The increased care to properly pulverise and even dissolve manures, so as to distribute them thoroughly through the soil, is another first-class example of a most important improvement in farm practice. On the other hand we have to confess the increased value of the town sewage, due to the improved drainage of our towns—which is still suffered to go to waste. On the whole, however, there cannot be a doubt that the increased fertility of the soil is due not only to improved drainage and tillage, but to the direct application of fertilising ingredients in a more liberal and economical manner.

3. Leaving now the soil, we have the way in which its increased fertility is developed and expressed. I suppose in the first place it will on the whole be admitted that, at least on arable lands, there are fewer weeds; our fallow crops are cleaner; our tillage and manures are not wasted so much on plants we do not want to grow. That is the first fact, as I believe it to be, under this head.

Another is the prevalence of rotations of crops in which bare fallows are diminished, and in which there is a larger acreage of the more valuable crops. The prevalent rotation of the country is the four-field course, in which wheat, turnips, barley, and clover occupy one-fourth of the land apiece. But it is common on well cultivated land—where the land is folded by cake-fed sheep, and where a top dressing of guano is given to the corn, to take a crop of wheat between the turnips and the barley, so that three-fifths instead of two quarters of the land are in grain crops. One half of the clover land, too, is often sown instead with peas or beans, so that five-eighths instead of three-fifths are in grain. Again over large districts, especially in Scotland, potatoe culture does to a great extent displace turnips or other fallow crops, and this provides a great increase of food for man.

But besides the adoption of improved rotations, we have to report the improved cultivation of individual crops. I suppose that the gradually diminished quantity

of seed used per acre in growing grain crops—as drill husbandry extends, and as an increased independence of mere custom becomes the rule, each man determining his practice for himself—will be admitted by most people as an example of this kind. Certainly every one will admit that the extension of drill husbandry in the cultivation of root crops, the extended use of the horse-hoe in the cultivation of grain crops—the extended use of so-called artificial manures as top-dressings and otherwise in the cultivation of all crops—all illustrate the improved cultivation of the plants by which the greater fertility of our soils is expressed and utilised.

Again, we owe our better crops to the selection and adoption of better sorts of the plants in cultivation. I do not suppose that individual sorts have improved upon our hands. Probably, as a general rule, they have deteriorated. But new sorts are being perpetually introduced, and of wheat, barley and oats, mangel wurzel, swedes, turnips and potatoes, cabbages, and vetches, a man can grow sorts as good as any—I think probably better than any—that his predecessors have known.

4. We now come to the produce of meat, and the question of sort has a great deal to do with our improvement here. There are probably fewer acres now devoted directly to the growth of cattle food than there ever have hitherto been, and though, notwithstanding this, I do not doubt that owing to liberal and vigorous cultivation we grow more tons of cattle food annually than ever, yet it is not so much to this as to our improved sorts of cattle, sheep, and pigs, that we owe our increased produce of animal food. Our sheep are now ready for the butcher at 14 months old; our cattle at 24 and 30 months. Formerly it needed at least two years of feeding to make a smaller carcase of mutton, and at least three or four years' feeding to make a smaller carcase of beef. A thousand sheep upon a farm in March or April now mean something like 500 ewes in the lambing fold, and 500 sheep ready for the market. Formerly they meant not more than 300, and those a smaller lot ready for the butcher. And this great increase in the meat produce of a given head of stock is witnessed as much in pork and beef as it is in mutton.

All the important breeds of cattle, sheep, and pigs have improved and increased in numbers during this period. Mr. Strafford receives entries for his herd book from four-fold the number of short-horn breeders, and the influence of this, the dominant breed of cattle, in crossing the general stock of the country has wonderfully increased. Messrs. Duckham and Tanner Davy report no falling off in the number and quality of the more local breeds of Hereford and Devon. Both Down and long-woollen sheep, and especially the latter, have made great strides, both as to increase of numbers and general improvement; and much more general interest is taken in the improvement of the breeds of swine. The public attention has lately been drawn, or rather driven, to the fact that disease is rife among our stock, and it is said to be increasing. It is one part of our evidence for the fact of great agricultural improvement that an evil of this kind, whether general or local, and wherever it exists, is not now left to fester, but exposed and probed by an energetic public agitation, which will undoubtedly promote its cure.

The greater rapidity of growth, and the increased size of our improved stock, both well illustrated by Mr. Herbert's figures, in the *Royal Agricultural Society's Journal*, which describe the supplies to the metropolitan market, are owing partly to the better food we give our stock, as well as to their increased precocity, and the enormous extension of better bred stock. And thus, as part of this experience, we have a supply of more fertilising manure and an increased growth of grain crops. It is, I believe, the fact that there are more acres of corn grown now than ever has before been known in England, and I look upon this as a proof of agricultural progress. And, so long as this is consistent with the maintenance of fertility, it is certainly for the interests of the consumer. It is said

our climate is especially favourable for the growth of green crops. I believe we grow more bushels of wheat per acre than any other country, whether we have so good a climate for it or not. And if the present extravagant cry for laying land down to grass which has hitherto grown grain and green crops in alternate husbandry shall to any extent prevail, I do not know who is to benefit by the change. Landlord, tenant, labourer, and consumer, are alike interested in the larger produce and more energetic cultivation of arable land.

The progress which I have thus sketched has been achieved rather by the extension of good agriculture than by the invention of any new process during the period of it; and yet there is enough of novelty and change apparent, too, on comparing the farmer now with his predecessor then. Bones and rape-cake, soot and salt and gypsum, lime and marl, and composts used to be the principal methods of adding directly to fertility; and indirectly the same end was attained by the cultivation of successive green crops, feeding rye and rape, vetches and turnips, and cabbages off successively upon the same field. This "double" culture was advocated confidently as the perfection of arable cultivation 28 or 30 years ago. Hear Mr. Middleton, who edited the 20th edition of Arthur Young's *Farmer's Calendar*, writing on this very practice. "That very numerous class of supine persons," he says, "whose minds are so weak as not to adopt this practice, which is the most improved that is known, will certainly continue to complain of hard landlords and bad times. Such characters do not succeed in any profession; neither can they in agriculture. I had nearly said they deserve to be poor, but, whether they deserve it or not, their destiny is to be so."

Notwithstanding, however, Mr. Middleton's vigorous assertion of this practice, it is not thus that the farmer now in general seeks the increased fertility of his lands. He has guano, superphosphate, and other fertilisers at his command. He has machinery, not only for the increased efficiency, but for the cheapening of all agricultural processes. Steam-power both tills the soil and threshes out its produce. The mowing machine, hay-tedder, and reaper—the chaffcutter, pulper, and steamer—cheapen the labour of securing his crops, and economise the after use of them. Better plants are grown, and better animals are fed, and the fertility which came with profit under the best management in two or three years, is now achieved, perhaps with no greater profit, but almost at once.

But I believe that I have sufficiently illustrated the fact of agricultural progress. Let me now enumerate some of the helps and hindrances amidst which it has been accomplished.

#### HELPS AND HINDRANCES TO PROGRESS.

The original purpose of this paper was to bring into the brightest light that I could strike, the share which agricultural societies have had in promoting the progress which has been now described—the influence of farmers' clubs, of local provincial and national agricultural associations—and in what way it could be wielded more efficiently. To this end I have entered into correspondence with the secretaries of these societies; and learning from them the nature of the efforts and achievements which have thus in many places been witnessed, it is impossible to doubt that these societies have been of service in the promotion of good cultivation, both by the stimulating influence of the competition which they have excited, and also (though this is not so uniformly true) by the guiding influence of the awards that they have made. And in previously backward and secluded localities, especially where railroads and access to new markets have happened together with the establishment of the local society or club, great agricultural improvement has unquestionably been accomplished. It is, however, I believe, also unquestionable, that after all the society plays a subordinate and merely incidental part. The real stimulant to agricultural improvement is the self-interest of the land-owner

—the self-interest of the tenant farmer—which is sharper, far more earnest, more genuine and trustworthy than any external spur or rein, such as societies do to some extent supply. And thus it is in the business relations of the farmer that we have the real limits and conditions under which his professional ability appears. The terms on which he has hired the machine, the factory, the mine, or whatever his farm may best be likened to—the relation in which he stands to the owner of it, and to the labourer by whom he is to work it—these are the real rein and spur by which his progress is at once urged and guided. For here, as in other professions, most men know a great deal more than they practise. It is not always ignorance which hinders progress, which societies with their exhibitions and discussions might remove. Self-interest does not urge them, or rather it is self-interest, after a wary consideration of their circumstances, which restrains them. And thus it is that first among the helps and hindrances upon our list stands the relation of landlord and tenant.

#### RELATION OF LANDLORD AND TENANT.

All agricultural readers know that this has been the subject of very general discussion lately at agricultural meetings. A society in Suffolk has offered a prize for the best form of agreement between landlord and tenant; Lord Lichfield, in Staffordshire, has done the same; and the Vale of Evesham Agricultural Society has issued the result of its studies of the subject. The salient points of the discussion were perfectly brought out at one of the meetings in connection with Lord Lichfield's prize agreement. The Earl of Shrewsbury is reported to have spoken there as follows:—

"I hold that you cannot frame any agreement which can be binding everywhere, but you can do what I have done, namely endeavour to act fairly and honestly by those who live under you. I should be sorry, and I should feel it to be dishonest, if I allowed any tenant of mine to leave me in debt to him. I mean if a man put on to a farm that which would improve it, I should feel bound not to let that man leave my estate without being remunerated for what is unexhausted. That is the only fair principle that can be acted on. All other matters must be subjected to a give and take agreement. I am not averse to any good arrangement that can be made, at the same time I do not hold out any hope that I can make any change in my arrangements with my tenants. We have agreed well together so far, and I hope that we shall continue to do so. Where there is a desire on both sides to agree, we are not likely to fall out. I adhere to what I have always said respecting leases, namely, that nothing will induce me to give a man a lease, because in the first place a lease is all on one side. The landlord remains, but the tenant if he be inclined to be fraudulent may go. I boldly and honestly state I will never surrender my property to a tenant. I mean that no man who will allow his sons to poach and act disgracefully shall have control over my land for a number of years. I will have an agreement for the mutual benefit and protection of myself and the tenant, and if any agreement really better than the existing one can be found, I will adhere to it. I hope that my tenants will feel confidence in me and my successor, and that they will be content to lay out their money with a feeling of security."

I do not recollect anywhere to have read a clearer, more straightforward statement of what is, I believe, the prevalent feeling among owners of land. It would of course be little better than impertinence to say that Lord Shrewsbury has a perfect right to dictate the terms on which he will let his land—this everybody knows. At the same time everybody, I am sure, also knows and feels that his lordship cordially admits the public duty by which the theoretical omnipotence of ownership is practically limited. It is only as among the helps and hindrances to agricultural progress that we have any right to the discussion here of such opinions as he has expressed. The promotion of that progress, meaning, as it simply does, more food per acre, is what every public-spirited man will admit to be a public duty, and therefore it is clearly within the scope and object of this paper to consider the

influence on agricultural progress of such a resolution as Lord Shrewsbury has expressed.

I am not going to weary you with the oft-repeated and irrefutable argument in favour of leases for a term of years as tending to increased fertility—to that increased outlay of capital in cultivation on which the productivity of the land depends. But there are two or three points which Lord Shrewsbury's speech has mooted, on which as many short remarks may be made.

I ask then, first, with reference to leases—Is it true that the lease is all on one side?

On the contrary:—Put all the advantages on that side which it confers, it is the instrument which not only secures those advantages to the tenant, but which secures to the landlord the annual sum or rent at which he himself has valued them.

Again, with reference to tenancy-at-will, I ask—does the landlord "remain"? We all know that the word "changeable" applies to a man's will as well as to his person. The landlord does not remain, and his successor, whether he be the inheritor of his property, or himself in a different mood of mind, may in the case of a tenancy-at-will, arbitrarily put an end to an unwritten bargain.

Thirdly, as between leases and tenancy-at-will, Lord Shrewsbury says, "I will never surrender my land for a series of years to a tenant." Under tenancy-at-will, however, a tenant is asked to entrust his property in great measure, and I will say in *greater* measure, to his landlord. For it is much truer to say the land remains, than it is to say the landlord remains. I do not hesitate to say that in the case of well-cultivated land of average fertility, there is not under leasehold farming so much of the landlord's property per acre in the power of the tenant to injure or destroy, as in the case of tenancy-at-will there may be of the tenant's property per acre within the landlord's power to appropriate. A landlord may say, "I will never surrender my property to a tenant," but in point of fact he never does surrender his property to a tenant. The land remains—it cannot be destroyed. We hear from Baron Liebig of the exhaustion of the land—no such thing is known in practice. I do not suppose that in average circumstances what is practically known as "worn out" land is ever injured to the extent of two years' purchase. That is to say, a farm—and if it be held on lease, we must suppose the tenant to have been not only fraudulent but a fool—a farm which has been injured as much as such an one might do it, would be readily taken at the old rent, provided the new tenant had it the first two years for nothing. The injury which a fraudulent tenant can do—*provided he be also a fool*—may thus amount to £3 or £4 per acre. On the other hand, taking the case of a man farming land as it may be profitably farmed (in the manner which alone contributes to agricultural progress) where a large expenditure has been incurred perhaps in draining, certainly in liming, in burning, in boving, in marlimg, in artificial manures, and oilcake and other purchased food for cattle and for sheep, all of which require time to realise their effect upon fertility, and I say the landlord has more than £3 or £4 per acre of the tenant's property within his power.

"Well!" it may be rejoined, "it is the object of this model farm agreement to graft on the system of tenancy-at-will such a bargain as shall ensure the repayment of these £3 or £4, or whatever the unexhausted outlay may be. Lord Shrewsbury proposes to adopt this, and the objection to which you have thus alluded—putting it in as personal a manner as possible—thus falls to the ground." There is not a chance within the hour of discussing the essential superiority of the lease for a term of years over any modification of tenancy-at-will, however bolstered up by these provisions for the repayment of unexhausted improvements. And, therefore, with reference to this rejoinder, I will only say that I cannot help the personal aspect in which the systems of lease and tenancy-at-will of necessity are regarded. It is the personal aspect which is the real one. Landlords, of course, inevitably entertain

the personal question first and foremost, and if obtruded on the one side it must be entertained upon the other. It is even less a tenant who will cross-crop and starve the land, than a tenant "who will permit his sons to poach and behave disgracefully," that is feared. After all it is the fear of having an ill-conditioned set of neighbours that is at the bottom of the dislike of leases. Experienced land-agents will tell you that it is altogether a mistake to apply general rules to the management of property. They say, "The majority of farmers don't want 'a field for the investment of capital,' as the phrase goes; they want an occupation and a home. Leases will not change the nature of a man; and, in fact, few things more obstruct agricultural progress than the system of dealing with farmers as a class (which they are not), instead of as individuals on their individual merits, which include as much variety as exists among any other body of their fellow-countrymen."

To this most people will, I think, agree; and in accordance with it one of the chief advantages I claim for leases is, that where adopted as a system greater individual care is taken in the admission of tenants on to an estate. And in accordance with it, too, one of the chief articles in the indictment against tenancy-at-will is that it is based upon a class treatment of the very kind which is thus condemned. It has, I believe, been proved in other walks of life that the plan of universal restriction—of treating all men with suspicion—of making your general arrangements hinge on the possibility that every man is a rogue, is a blunder. It is an especial mistake in agriculture. For there is a certain class-colouring perceptible, as in other professions, so in farming, and tenant-farmers may be safely spoken of as a worthy and well-conditioned body of men. If, as is ludicrously feared, a general prevalence of the lease should displace the homely and neighbourly class with whom in English country districts one has so long enjoyably associated, by a set of energetic, ruthless, restless, money-making "sharps," the change would be lamentable indeed; but the fear is ludicrous. However many new men may be entering agriculture from other walks of life, it will always be that the bulk of farmers have been bred by farmers. And it is, I believe, an easier and a better thing to engrraft upon the characteristic good qualities of the class, or rather (for they already exist) to foster there the intelligence and enterprise, and energy of commercial life, by adopting more generally a commercial view of the relations between landlord and tenant, than it will be to engrraft a strict valuation and acknowledgment of tenant right upon the system of tenancy-at-will.

I am aware that this subject has thus been barely touched—that in order to the full discussion of the influence of the well-drawn lease on farm practice—the great body of experience relating to it both in agriculture and in other businesses ought to be at least alluded to—that in particular those conditions of the lease which limit the power of the tenant to use his own judgment and intelligence and resources in the cultivation of the land; as well as those conditions which maintain, or define, or abandon the landlord's right, if he choose to exercise it, to preserve a live stock of his own upon the crops grown upon his land, should be discussed. The maintenance of an unlimited quantity of game upon the tenant's crops, consuming much that would be food for man and injuring the remainder, is of course fatal to agricultural progress, and has in many instances already proved so. And had there been time, it would have been my duty to put this fact with the others which are dealt with in a well-drawn lease as clearly as possible before the readers of this paper. Failing opportunity for this, however, I am very glad that if the relations of landlord and tenant should be the subject matter of the discussion which will ensue, we have, as Chairman, one enabled to "moderate" in such a discussion by a long and useful experience of the influence of a liberal and well-drawn lease, not only upon the fertility of the land, but on the

character of the tenantry and on the condition of the labourer.

The other business relations affecting agricultural progress are those existing between the farmer and his labourers. It would have been easy enough to show that agricultural labourers, still badly enough off in many districts, have largely shared in the advantages of recent agricultural progress. Wages are better—a good deal more is being done to the improvement of cottages—and day and evening schools are exerting an unquestionable influence. The good will and intelligence of the labourer, both of which have thus been increasing of late years, are also among the greatest helps to further progress—and this is especially true now that steam-power is being used everywhere—in the fallow field as well as in the barn and feeding house. I merely name this subject, however, and hasten on to consider the way in which agricultural societies have influenced and may further agricultural improvement.

#### AGRICULTURAL SOCIETIES.

To this subject, which should have been the main topic of my paper, I must now devote the remainder of the hour. There is, I believe, nothing in other professions corresponding to the Agricultural Society. There are no mutual improvement societies among those who supply us with our apparatus, or our means—agricultural machine makers, manure manufacturers, and seedsmen. Nor are there mutual improvement societies among those who deal with our results, as millers, brewers, bakers, and butchers. Every man among these, notwithstanding that for some special purposes, *e.g.*, mutual protection, they may unite, does the best he can for himself, and stands or falls by his own merit or demerit. This is of course also true of farmers. But the Agricultural Society, like many another feature of our profession, arising out of the peculiarity of its raw material—land, is as much a social as a strictly technical or professional institution; it deals with and affects a whole country side, and the whole population is interested in its proceedings. This is more especially true, however, of only one class of agricultural societies. There are several: and it is plain that it is only by a short reference to the classes under which the many hundred agricultural societies of this country may be arranged, that I can hope to illustrate my subject.

Proceeding from the ranks of the tenant farmer on either side of him, there are first the strictly farmers' clubs, meeting for periodical discussions of agricultural topics. They were once very much more numerous than they are now. Only a few have survived from the period of twenty years ago, when a great many were in activity. They have unquestionably been of great service in publishing agricultural information, in the direct introduction of improved practice into their respective neighbourhoods, and in establishing better business arrangements.

As to the publication of agricultural information. Their discussions, generally published in the county papers, and their annual reports distributed to members, are sure of being read by those to whom they are addressed, which is a great deal more than can be said of other agricultural publications. I have an immense mass of reports, through many successive years, from a great many of these clubs, and there is no better agricultural library—no more useful one, if only some means were devisable for indexing or arranging it.

We have a Central Farmers' Club in London distinguished for the great practical value of its monthly papers and discussions. I do not know that it claims anything more than geographical centrality. It would, however, be of great agricultural service, I believe, if it were also officially central with reference to these institutions, and if its library contained the annual reports of all the local societies, or if its secretary were the editor of them, so that an annual volume of selected papers might be prepared, to which more prominent influence might thus be given. A connection through some central officer in this

way would tend to the permanence of these local institutions. They are very shortlived, and this in various ways has been owing to their strictly local character.

These institutions have not only kept their members informed—they have often introduced new practices into their localities. The Morayshire Farmers' Club, established so long ago and thriving still, was, I believe, the first to call general attention to the value of superphosphate as a manure. And long before this (I believe early in this century) it had deputed the late Mr. Forsyth, its secretary, to visit Norfolk, and bring back agricultural information for its guidance. The Ayrshire Farmers' Club, by the adoption of similar means, appointing deputies to visit and report upon the dairy districts of England, has been the means of introducing the Cheddar cheese manufacture into its county. The business arrangements of their locality are also often most usefully guided by these societies. The erection of corn exchanges—the alteration of market arrangements, and the establishment of new markets, are among the subjects which are often thus regulated.

As an example of the great service done thus, I will quote a report from Mr. Wilson, of Edington Main, regarding the Union Farmers' Club, a Society embracing more than one county:—

" Its head-quarters are at Kelso; it is of long standing, and has had upon the whole a useful career. I would specially refer to the annual sale of Leicester rams, now of some dozen years standing, which was begun and is carried on under its auspices, and which has been a great success. It has tended most directly to the preservation, improvement, and wide dissemination of that truly valuable breed of sheep, the Border Leicester. For several years past about 2,000 shearling rams, chiefly of that breed, have been sold by auction at this annual Kelso ram fair, and have been widely dispersed over Scotland, Ireland, and the North of England. These rams are for the most part bought for crossing either with pure Cheviot ewes or with ewes of the first, second, or third cross from the Cheviot. These crosses are a truly valuable kind of sheep, and it is with them that the arable farms of Scotland are now chiefly stocked. This annual congregating of rams from the flocks of so many different breeders, and the sale of them by auction at the same time and place, both affords ample choice to customers, gives to the ram breeders the best opportunity of knowing exactly the kind of animal that is in demand, and brings them under the influence of far more powerful stimulus to exert their utmost skill and care than any system of prizes for selected animals could do."

This is only one illustration of a whole class of public services rendered by local clubs.

It is impossible to enumerate even a tithe of the many local institutions which have been of immense local benefit in all these ways. In the North of England, the Newcastle and the Hexham and Penrith farmers' clubs have distinguished themselves by the valuable papers read at their meetings. The St. Quivox Farmers' Club, in Ayrshire, and the Wirral Farmers' Club in Cheshire, and the Maidstone Club (Kent), have occasionally adopted the useful plan of going in a body to visit particular farms and localities. Others have instituted book societies for the loan or circulation of the leading agricultural works.

Among the defunct institutions of this kind, whose annual reports are full of useful information, I may mention Gloucester. Among the longest lived and still surviving, similarly distinguished, I may mention St. Austle, in Cornwall; and Framlingham, in Suffolk; and Wirral, in Cheshire. Among the newer and more lately established farmers' clubs, which have also attained high merit in this way, I would name the Kingscote Farmers' Club in Gloucestershire.

I have an immense mass of local correspondence and reports from the officers of these institutions, which it is impossible to epitomise, but I hope to publish it piecemeal hereafter. A great help to this most useful body of societies would, as I have already said, be given by a central office, such as the Central Farmers' Club might be, through which every individual society would be kept in commun-

nication with all the others. The Society of Arts has thus inspirited and aroused all the Mechanics' Institutes of the country, and a similar service might be done to farmers' clubs in a similar way.

2. There is a second class of local agricultural associations, of which I can give no detailed account, simply from want of space and time. They have, however, I believe, exerted a very useful influence on agricultural improvement. Labourers' Friend Societies, as they are called, are scattered pretty thickly over England; their prizes for skill in the ploughman, shepherd, hedger, and thatcher, and so on, have unquestionably led to useful rivalry and great improvement in the ability of the agricultural labourer. If any one wants information on the services which such a society may render, he should apply to Mr. Clarke, of Long Sutton, Lincolnshire, who has long superintended the operations of a most efficient association of this kind. There is many a locality where both master and man have thus benefited, and where the improvement, and, still more, the desire for improvement thus implanted have directly furthered agricultural progress.

3. I could give many examples of this, but must hurry on to the third and most important class of all, including all those societies which act mainly by the annual show of implements and cattle exhibited in competition for premiums awarded by the Societies' judges. They are of all ranks, as to extent of the district to which they are confined and of the funds they administer. These societies have unquestionably been of great service to agricultural progress. They are useful in their social relations, as affording good-humoured gatherings of all classes with a common interest in view; and, professionally, they excite the rivalry and guide the judgment of those who exhibit stock or implements at them, and they confer commercial rank and afford commercial opportunities. The personal rivalry which they excite is as powerful an engine in the hands of the purely local societies as it is in those of greater pretensions; and there are in every locality now so many herds, and flocks, and manufactories, which send out specimens of first-class merit, that these local societies are also serviceable in the second way I named, by giving to spectators models of excellence for their professional guidance. That these local societies, which, with their sweepstakes and local prizes, have always been serviceable in stimulating the farmers of the district now stand so high as also affording examples of first-class excellence in every department of their shows is due, in great measure, to the influence of the greater and provincial societies, which, having a wider basis and more extensive district, have made merit in all these departments generally known when it was rarer. These provincial societies are now generally swallowing up the local ones. I think it is a pity that the local societies should disappear in this way. There is an almost domestic character about their annual meetings, by which a more personal influence is exerted on exhibitor and spectator—and a more wholesome influence is exerted on the relation of master and servant by the annual holiday thus spent together. And where these societies obtain the services of judges of well known character from a distance, their decisions are not only of great service, but they are accepted, and thus the feeling of angry disappointment which is sometimes felt by exhibitors at these local shows has little chance of development.

The county and provincial societies have latterly enormously grown, many of them distributing a thousand pounds in prizes at their annual shows. They attract large quantities of stock, and a sufficient company is drawn together to induce the manufacturers of implements not only of the locality, but from a distance, to expose their wares, whether there is any competition among them for prizes offered by the Society or not.

Most of these country societies meet annually in successive towns within their district, and the whole force of the exhibition and the company is thus brought to bear on different localities in turn. The provincial societies—

the Yorkshire and the Bath and West of England, which include either several counties or one as large as several, adopt, of course, with an increased effect, this principle of directing the whole force of a province on successive points within it. The latter of these Societies, which has other objects beside the strictly agricultural object, and thus can more directly claim the cordial sympathy of the Society of Arts than any of them, has by adopting this very principle lately taken a new lease of life. Invigorating, and being invigorated by the several districts which it visits, it has grown in all the departments of its show to the very highest rank of excellence and influence. I refer to it especially, because it has soonest of any of these great societies seen that the agricultural machine department has outgrown in many ways the power of the society to exercise with any good effect either the guiding or the stimulating influence which prizes have hitherto exercised. The Bath and West of England give no prizes, but merely room and opportunity to exhibitors of implements; and the usefulness of this department of their show has not in any way diminished.

The great national societies by which the stock of every breeder and the machines of every manufacturer are made known at the annual show to buyers of all counties and of all countries, and by which the agricultural force of the whole nation is discharged upon one province after another, as the great association makes its annual step from one point to another in the course of its journey once in 12 or 15 years around them all—these are the last agency of this class for agricultural improvement to which I shall refer; and, confining myself to the Royal Agricultural Society of England, although I do not think it necessary to enumerate the many proofs which exist of its usefulness, as seen in the multiplication of good herds and flocks, in the increased activity of the provincial societies in the districts it has visited, in the improved agriculture especially of the more secluded of these localities, and in the general extension and adoption of improved implements, yet no one is more thoroughly convinced than I am of the great national service that it has rendered in all these ways. I will quote but one slight but (as it is definite and local) striking illustration of the kind of good which in one of these ways it has done, simply because it is just to that one way that I purpose to confine the rest of my remarks on its management.

In a very interesting report by Mr. Jefferson, of Whitehaven, on the proceedings of the West Cumberland Agricultural Society, he says "Thanks to the Royal Agricultural Society's holding their meeting at Carlisle, I believe that exhibition was instrumental in opening the eyes of many of our Cumberland mechanics. Previous to 1855, our county was wont to boast of her ploughmen, but when it came to the test at Carlisle, we were well beaten upon our own soil; not that our ploughmen were deficient in skill, but they had not the implements to work with."

It is to the implement department of the English Agricultural Society—to the prize system as carried out in its annual shows, and to the influence of it upon the agricultural machine department, that I shall now confine myself. And during the few minutes which remain to me, I shall endeavour to state the reasons for which I believe that the prize system, as applied to the machinery department of the show, is a failure.

The awards of the Judges are made after insufficient trial. During July, which is the usual month of meeting, the state of the soil and of the crops upon it is not adapted for the trial of whole classes of machines; and even if it were, the time allowed the judges for arriving at their conclusion is with reference to many machines altogether inadequate: and I believe that the Society would both guide and stimulate manufacturers better by appointing judges to report at leisure on the experience of localities respecting this, that, and the other machine, than it does at present, by submitting all, in a sort of scramble, before half-a-dozen judges on one spot. Then, again, the award

of a prize confers too great, *i.e.* too abrupt, a distinction. As regards many machines whose work cannot be expressed or represented by numbers—the plough for example—the prizeman wins, the rest are nowhere. There never probably was a more marked example of this than at the Warwick show, where a new man appeared as ploughwright, and took many of the principal prizes. His plough, a good and well-made tool, as all of Messrs. Hornsby's manufacture are, pressed the furrow slice tighter home, and left a higher crest than the others. Its work gratified the eye—the judges pronounced it best—and their decision was an altogether excessive advantage given to the firm.

No doubt a tightly-laid furrow slice is, for some purposes, advantageous, but all the tendency of late has been to regard tillage as a smashing up; and where the land tilled lies on a drained subsoil, the rougher the surface is the better for its future tilth. But it is an illustration of the excessive character of the prize system that, whereas the decision at Warwick placed Messrs. Hornsby on a pedestal while Messrs. Howard and Ransome, and others, were, so far as the Society was concerned, in the case of that particular competition, nowhere, I do not suppose there are ten practical tillage farmers who will say that it matters one penny per acre per annum whether Hornsby's, or Howard's, or Ransomes' plough is adopted as the implement of the farm. Yet, still, year after year, ploughs are pitted against each other as if some new form of the tool were yet to be forthcoming, or as if three men, clever as they may be, could in a few hours' trial, fish out the microscopic differences which may exist. The whole thing has now dwindled to a mere ploughing match, and the firm that can tempt the cleverest ploughman to its service wins the day.

Although, however, to the extent of their value, the distinctions awarded at these shows are excessively abrupt, as well as liable to error from inadequate previous trial; and although, no doubt, originally, the award of a prize, during the earlier years of the Society's proceedings, was a great advantage to the winning firm, yet it is proof of the unfitness of this system to the existing state of the manufacture that it has now little influence on sales. This can be shown by examples, both of commercial success without prizes, and of failures notwithstanding prizes. To give names would be invidious, and I will, therefore, merely say that I know of a tillage implement which for years obtained a sale of thousands, before the Society's judges would consent to give it a trial. At length, for two years it was placed first, but the manufacturer declares that no impetus was given to the sale of it by these awards, while, in a subsequent year, after a rival had distanced it in the show-yard, the orders received for the tool were unusually numerous—400 more than could be executed. Again, I know a whole class of tools which for years were demanded, and patronised, and at length rewarded by the Society's judges, but they have never come into use. For these machines one maker received six prizes, and never sold one; one indeed he parted with, but it was very soon returned to him as useless.

I could name to you firms which have repeatedly received first prizes for another whole class of implements, who have never succeeded in gaining the public patronage, although they have had that of the judges, while others, who took hardly any of the prizes, have, nevertheless, taken all the orders.

Lastly, I could name an example in which a firm lost its trade in a particular tool by anxiously following the leading of the judges, regaining it, however, as soon as they resolved to depend on themselves. Making 700 or 800 implements of the kind annually, and taking prizes perpetually, yet following the lead of the judges, complaints from customers increased, and trade diminished year by year, until, from 700 sold each year, the sales dropped to 50. At length the manufacturer called his men together, that they might consult in order to recover the art they had lost. "You have been ~~bananized~~,"

he said, "out of your ability by following false leadership. Here is one of the old tools, made twenty years ago; copy it in every particular." "Ah! Mr. ——," said one of his customers shortly afterwards—one who had complained of a machine he had previously bought,— "this one answers perfectly; you have learned at length to make the tool work." He had but retraced the steps of twenty years' false leading. This may seem a one-sided and extravagant illustration of my point. Unfortunately, it is a true one.

The trials are inadequate. There is a false advantage given to mere novelty—the prizes are in effect a premium upon mere speed and capability of standing a short race—on all these grounds it is improbable that the awards can be trustworthy. The prizes are too abrupt a distinction, and yet their influence on the trade is small, and both of these facts indicate that the time has arrived when, with reference to the implement department of the show, the prize system should be abandoned. There is one further consideration affecting the implement trade generally to be urged against it. It adds considerably to the cost of agricultural machines. One firm says it has spent £30,000 during the Society's meetings up till now, in preparing and exhibiting for prizes. Another estimates its expenditure at £20,000; a third says the disorganisation of the work—the spoiling of the best men, and the actual expenditure are together past estimate. Who has paid these large sums? Not these firms, but their customers. The cost of a machine is made up of the material it is made of, the labour spent on it, and a whole class of items which come under the general designation of waste charges. These waste charges amount to no less than 30 per cent. of the selling price, and the expenditure at the Agricultural Society's shows is a principal one of them.

There need be no fear that the shows would dwindle though prizes were abandoned. The manufacturers will not lose the chance of so good an advertisement and market as these shows afford. In fact, though protesting against the prize system, yet they will endure it rather than give up the show, and many of them who protested some years ago and refused to exhibit, are, nevertheless, coming round again. Commercial success, which hinges on the efficiency of the machines made, is a sufficient stimulant to the manufacturers; and if the Society think that they can usefully guide the manufacture, let them appoint judges as heretofore, not to award prizes, but to make suggestions and reports. The exhibition may be as much under the control of the Society as hitherto, and the opportunities given to the exhibition for showing their tools and implements at work, may be as completely arranged as hitherto.

In the quadrennial division of the exhibition which is now adopted, there is a certain confession on the part of the Society of some of the evils attending their present plan. I believe their influence would be as useful and as real if they were to abandon it altogether.

But I have exceeded my time, and therefore I now leave this subject, and shall conclude with a short reference to the other branch of the general subject of helps to agricultural progress, coming to it through one mention more of the class of small local societies named at first.

#### AGRICULTURAL EDUCATION.

It is to the credit of a local farmers' club, that the only agricultural college in Great Britain originated in a paper read by one of its members.

The late Mr. Robert Brown, of Cirencester, read a paper, some twenty years ago, before the Fairford Farmers' Club, recommending systematic education for the farmer, and urging the establishment of a public agricultural school. Armed with the approving resolution of this Society, he aroused the gentry of the neighbourhood and county, obtained the support of public men and the patronage of the Prince Consort, and ultimately succeeded in raising a fund sufficient for the erection of the college buildings. The shareholders are incorporated by royal

charter, and the institution, saved at one time by the public spirit of Mr. Holland, of Dumbleton, has continued, with varying prosperity, to impart an education in which the theory and practice of agriculture are combined.

The importance of the systematic education which is to be acquired as a whole at Cirencester, and piecemeal elsewhere, is the last consideration affecting the progress of agriculture to which I shall refer. Ours can be no exception to the rule of all other professions. There are great public schools of divinity, medicine, and law, and as the future rank of the individuals who have passed through them, so the status, from time to time, of the professions themselves, connected with each, depends on the efficiency and thoroughness of the professional education acquired. Agriculture, which deals with a larger capital, and provides a larger annual income than any other profession, ought to support and be supported by its schools. And I believe it is within the scope of our agricultural societies to attend to this. So directly was this seen by the promoters of the Royal Agricultural Society of England, than one of the ten objects for which its royal charter of incorporation declared it to have been founded was, "to take measures for the improvement of the education of those who depend upon the cultivation of the soil for their support." I have been a member of the Society from the year of its formation, and I submit to those who are responsible for its guidance that, from that year to this, nothing has yet been done by it in discharge of that particular duty which it then assumed.

It seems probable that the reason why comparatively little success has hitherto attended schemes of agricultural education is that the practical element has been in efficiently attended to. Certainly, no man is perfectly taught until he has acquired a practical knowledge of his business. There cannot be a doubt, I will not say of the absolute need of the practical part of agricultural education, but of its being the element which alone makes the education agricultural. The physiologist, the chemist, and the botanist, already have a knowledge of the general laws which include all the facts and phenomena of agriculture, but though any one combined the knowledge of them all, he would not therefore be an agriculturist. None of them could make a living off a farm unless he also possessed a knowledge of farm practice, and therefore it is that no school or college will be ever trusted, or have any claim to be considered as an agricultural school or college, unless the practical teaching is regarded as the aim and end of the institution.

One is perfectly willing to admit, nevertheless, that agricultural progress depends in great measure on that general intelligence and scientific knowledge which includes the theory of agriculture. The scientific and the practical man really are and ought to feel themselves allies, as much so as the geographer and traveller. The one knows the map, the other has a knowledge of the country. The one knows the several bearings of the route—the other knows the difficulties of the way. To be a successful traveller needs indeed the tact, and skill, and courage, of the practical man, but it also needs the previous knowledge of the geographer and man of science. And agricultural improvement regarded as a progress is necessarily guided by the great landmarks of scientific truth; and a general knowledge of the facts and doctrines by which these landmarks are established must tend to its promotion.

It is to the credit of the Society of Arts that this subject, notwithstanding the many to which its attention is more particularly directed, has not been neglected by it. Its annual educational examinations include Agriculture among their subjects. The Highland and Agricultural Society of Scotland, too, confers its diploma after an annual examination in the sciences and practice of agriculture by a board of professors and practical farmers. The Agricultural Society of England, originally committed by its charter to direct action on this subject, has hitherto been inactive.

## IN CONCLUSION,

It only remains for me now to thank you for the patience with which you have listened to my long and tedious story. Its large subject has necessarily been very inadequately treated. The lease as giving the tenant security for his capital—provided (unlike many taken out of the dusty pigeon holes of an office) it also gives him liberty for the exercise of his intelligence—and the agricultural college for imparting a sound practical and scientific professional education: These are the great helps to agricultural progress. Agricultural Societies are also a great stimulant and help; but their chief use and merit is in having interested the landowners of the country in agricultural pursuits, for agricultural progress depends quite as much on good landowning as it does on good farming. Good service is done, I believe, to agricultural progress by the attraction of educated and wealthy men to agricultural pursuits. One word more, therefore, on the merits and advantages of the profession. We all know the general attractiveness of a country life; to this have to be added the more specific professional advantages of the art and business of agriculture. I do not claim for it a very lucrative or money-making character, but it is a maintenance and livelihood, and it has that, besides, which is more than money's worth. I believe there is in its intelligent prosecution more than in that of any other profession, scope for the exercise and enjoyment of the whole nature of man. There is opportunity, during its prosecution, for the cordial, frank and independent exercise of all the social relations. Landlords, tenantry, and labourers are generally a well-conditioned company. There is, certainly, opportunity in its superintendence for the profitable exercise and trial of most of the moral attributes. Temper, resolution, patience and perseverance are tried in agricultural experience, and receive in it their appropriate reward. There is ample intellectual scope amidst the subjects which it presses on our attention. The first intellects of the age have been engaged with enjoyment and success in agricultural research. The highest names in all the sciences—Boussingault and Liebig among chemists; Buckland, Murchison, and De la Beche, among geologists;—De Candolle, Lindley and Berkeley, among botanists have especially distinguished themselves in the agricultural relations of their several sciences. The farm is no mere field for dull routine; it is the platform on which the best minds of the day may well employ themselves. And I add, as holding, of course, a good place upon the list of agricultural privileges, that the physical enjoyments of a country life are no mean additions to its advantages. We can all of us, to some extent, at any rate, sympathise with the exclamation of the Arab echeik to Mr. Layard, as they went careering over the plain, then green with the first verdure, and enamelled with the first flowers of spring: "Oh, Bey! what else is there worth living for? What do the dwellers in towns know of true happiness—they have never seen grass or flowers. May God have pity on them!"

I ought, perhaps, to apologise for this somewhat wild ending of what has been intended as a sober statement of my subject, and I will, therefore, in a single sentence recall to your recollection the main object and purport of this paper. The general position which I wish to establish is that agricultural progress is principally dependent, first on the improvement of our means of agricultural education, and, secondly, on the soundness of the business relations in which the farmer is placed.

## DISCUSSION.

Mr. H. COLE, C.B., said Mr. Morton had opened up a number of subjects, any one of which would take hours to discuss properly. The condition of the agricultural labourer, though not altogether omitted, held an inferior place in the paper. He was not about to take a sentimental view of the condition of the farm-labourer; but there was one question which struck him forcibly, namely,

the present condition of the labourer's habitation; and, amidst the boasted progress of agriculture, he had never been able to understand the kind of economy which placed the habitation of the labourer lower than that of the horse, the cow, and the pig. Those possessing stock took the utmost pains to house it properly, whilst the labourer, in this respect, seemed to be left to shift for himself. He should therefore like, in the consideration of the relations of landlord and tenant, that this question of the labourer's home should also be discussed. The tenant farmer did not appear to recognise the folly of not having the labourer living close to him, as his horse did, and ready to do work when he was wanted, but allowed him to live miles off, so that he had to begin work with half the physical vigour taken out of him. There were brilliant examples where landlords did really look after their labourers' welfare, but he was afraid they were exceptions. This Society had recently offered prizes for good plans of cottages, to be built at a cost of £100 each, and he (Mr. Cole) did not wish to depreciate such a proceeding, but this did not touch the general question. When people began to see how much it was to their interest to build good cottages on their estates, they would do so, whether they got an adequate return in the way of rent or not. The question of the labourer's cottage was one which for nearly a century had puzzled political economists. Adam Smith, in his "Wealth of Nations," alluding to labourers' dwellings, said:—

There is scarce a poor man in England of 40 years of age, I will venture to say, who has not in some part of his life felt himself most cruelly oppressed by this ill-contrived law of settlement.

Practical farmers would admit that Arthur Young knew something of this subject, and he had written as follows in his "Farmer's Letters."

It is too much the interest of a parish, both landlords and tenants, to decrease the cottages in it, and, above all, to prevent their increase, so that in process of time, habitations are extremely difficult to be procured. There is no parish but had much rather that its young labourers would continue single; in that state they are not in danger of becoming chargeable, but when married the case alters; all obstructions are, therefore, thrown in the way of their marrying, and none more immediately than that of rendering it as difficult as possible for the men, when married, to procure a house to live in; and this conduct is so conducive to easing the rate, that it universally gives rise to an open war against cottages. How often do gentlemen who have possessions in parish, when cottages come to sale, purchase them, and immediately raise them to the foundation, that they may never become the nests, as they are called, of beggars' brats! by which means their tenants are not so burdened in their rates, and their farms let better—for the rates are considered as much by their tenants as their rent. In this manner cottages are the perpetual objects of jealousy, the young inhabitants are prevented from marrying, and population is obstructed.

That was written about 80 years ago, and he would ask them whether that was an over-charged picture, as applicable to a great part of England at the present time. Then he would refer to another authority, well-known to most present, Mr. Samuel Sidney, who travelled through Lincolnshire eight or nine years ago; and what said he?

Next to our system of transferring land, our law of settlement is the greatest obstacle to the decent housing of our peasantry, as well as to the due cultivation of the land. Our labouring classes can never enjoy the full advantages which the railway system offers for equalising the demand for labour until the laws are modified, which made parish officers see in every strong-backed hind the father of a race of claimants for board and lodging at the expense of the union.

That sentiment (continued Mr. Cole) was, to a great extent, still maintained. He supposed it would be at once conceded that the labourer could not build cottages for himself. The tenant farmer would not build them. The landlord would build them if he was a sensible man, but in too many cases the labourer did not get such a cot-

tage as decency required him to have. The law interposed, for the sake of the health of the population, in mines and factories, and caused parishes to pay for the maintenance and cure of people who contracted illness through defective sanitary arrangements in their houses, but it did not interpose to cause those habitations to be what they ought to be. The law said people might be housed and fed at the parish expense, but did not provide a cure for evils which everybody must admit to exist. Whilst the dwellings of the labourer were allowed to remain in their present condition all education was neutralized, and all attempts to raise the condition of this class were thrown away. He hoped what he had said—not being himself an agriculturist—would be taken in good part, and that efforts would be made to try and find out how this great and acknowledged evil was to be remedied.

Mr. HARRY CHESTER said, though he agreed with Mr. Cole as to the importance of this question of the labourer's home, he, nevertheless, regretted he had brought it forward on this occasion; and still more, that he had made it somewhat a matter of complaint against Mr. Morton that he had not given sufficient prominence to it in his paper. Mr. Morton, like all other well-informed and right-minded men, no doubt felt as strongly as Mr. Cole did on this subject; but it was Mr. Morton's object to bring before an audience, composed principally of agriculturists, certain branches of the great agricultural question; and to have brought forward a subject of so much importance as the condition of the labourer's habitation, in a corner of a paper embracing so many subjects, would, in his opinion, have done little good. If, however, Mr. Cole would, on a future occasion, bring the subject prominently before the Society, he was sure he would do it justice, and they would all be glad to hear him. He was sorry to hear Mr. Cole use what seemed to be a mere rhetorical argument, when he compared the condition of the agricultural labourer to that of the pig, for there was this great difference between them: the latter was the absolute property of the owner of the land, but the labourer was not, and never would be in this country. Two principal subjects had been brought before them for discussion by Mr. Morton, one was, agricultural education; the other, the relations between landlord and tenant. It had also been suggested that the different farmers' clubs and other local agricultural societies should be connected with the Central Farmers' Club in London, and that a "union" might be formed, somewhat similar to that of the institutions connected with the Society of Arts. He would only say that if Mr. Morton thought the experience of the Society could be made available in furtherance of this object, he was sure it would be delighted to give its assistance; and having himself taken great interest in the original establishment of the Society's Union of Institutions, he should be happy if his experience in the matter would be of any use.

Col. CHALLONER said no one could entertain a higher opinion than he did of the paper read this evening, but he begged to differ from Mr. Morton upon one point in it. He should be sorry it should go forth as the opinion of this Society, that the giving of prizes by the Royal Agricultural Society for implements had not been beneficial to the progress of agriculture. No one had watched the advances made in the agricultural implement department with more care than Mr. Morton; and that gentleman was aware that at the first meeting of the Royal Agricultural Society, at Oxford, the number of implements exhibited was considerably under 150, and they were all of the coarsest description of manufacture. He asked what had brought the implements of England to the perfection in which they were at the present time? He submitted it was owing to the system of prizes adopted by the Royal Agricultural Society. He had been brought to this conclusion from his observations as a member of the Implement Committee of that society. Let them compare the position of implement-makers now and twenty years ago. The progress had been enormous, and he

thought that, without the prize system, the manufacturers would not have been guided to the production of the class of implements really required. There were well known names who had made a high reputation everywhere, and it would perhaps be very agreeable for those gentlemen to rest upon their laurels, with the knowledge that everybody would buy their implements; but what was to become of the humble implement maker—the man of small means? He had no chance of competing against those great men, except by the help of the prize system. It was the great object of the Royal Agricultural Society to bring forward rising talent; and he hoped his friend Mr. Morton would excuse his differing in opinion from him on this subject of prizes for implements.

Mr. JOHN FOWLER remarked that he stood in the position of a very successful exhibitor of agricultural implements, as far as prizes were concerned, and had never failed in obtaining the prize he competed for; at the same time, he thoroughly endorsed every word that Mr. Morton had said with regard to the prize system. He had many times been placed in an unduly prominent position by a prize—a position he had no right to at the time; and if the prize system were continued, it might be he should be placed in a position he had no right to the other way. With respect to the present system of awarding prizes by the Royal Agricultural Society, it was known to be a mere scramble, for there were often hurried and imperfect trials; but if, instead of this, a well considered report was made of agricultural experience with regard to any particular implement, this would be of real value. In the first place they must look at the circumstances under which the trials of implements were now made. The expense for land for this purpose at Leeds was £800, and the cost of 100 acres of land at Newcastle next year would be £500. He had offered to subscribe another £250 in order that the trials might be made on a more extended scale. They could not respect a prize which was given upon a trial extending over only a few acres of land, and confined to one locality, which had features of soil and other circumstances peculiar to it. Col. Challoner had stated that the prize system had made the implement makers what they were. He (Mr. Fowler) would say it had not made him. If the Royal Agricultural Society, instead of spending £500 for land for the trials of implements next year, would spend that amount in a careful examination into the present results of steam cultivation upon farms in this country—no undue preference being given to any individual—very valuable practical results would be obtained; and in that respect Mr. Morton's writings in the *Gardener's Chronicle* had been infinitely more valuable to him than all the prizes he had ever received. He was therefore opposed to the continuation of the prize system for agricultural implements, and he would prefer to see well-digested reports upon their merits as the result of test and experience in various localities.

Mr. E. HOLLAND, M.P., said, all those great improvements to which Mr. Morton had alluded could not be carried on by the tenant-farmer alone, but were more or less associated with the landlord and the labourer. There were formerly points in connection with the state of society which militated against every advance in agriculture, for at that time a tenant was more readily accepted by a landlord on account of his politics than his powers of farming. The labourer also was at that period in a far more wretched condition than at present. From the days of Elizabeth up to the time when the new Poor Law came into operation, the condition of the labourer had been gradually deteriorating; and the present Poor-law system was adopted as a remedy for a far worse system. Now-a-days a tenant was chosen because he understood his business and had capital to carry it on, and in proportion as the tenant improved in capital, intelligence, and experience, so would the condition of the labourer be improved. There was nothing of late years which had had so much influence

upon all connected with agriculture as the introduction of steam ploughing. Agriculture in this country had an enormous task thrown upon it. Allowing for emigration and deaths, the annual increase of population was immense. Besides this, the wants of civilisation must be met; houses, railways, and land for domestic purposes were required, the whole of which had to be taken out of the area which produced food for the people. But the steam-plough had been introduced, and the farmer discovered that by going more deeply into the land he could produce more food, and more or less keep pace with the increasing wants of society. This would not have been effected by the old class of tenant farmers. Men of capital and education were now taking their places, and the consequence was that they required a firmer hold upon the land than the man who had no capital and no education to direct the profitable employment of it—unless such men made a bargain with the landlord for the due security of the capital which they put into the land, it was not likely they would farm up to the wants of the present day. The consequence of this was, that the condition of the labourers was also raised, and though there might not be much in the matter of dress, yet he had found that on the adoption of steam culture, simply from being obliged to discard the smock frock and adopt a less cumbersome form of garment, the labourer had become a different man. The labourer must now wear an engineer's dress, and he became a different creature, and his social condition was also improved. Upon the subject of labourers' dwellings he agreed with much that had been said. He had recently found it necessary to build a good many cottages, the rent of which, to pay a fair interest upon the capital expended, would be £6 per annum, but the labourer could not afford to pay more than £4. He explained this to his tenants. There remained £2 per annum to repay him. This was arranged in the following manner:—The tenant, feeling the advantage he would gain by the improved condition of the labourer, agreed to pay half, while he, the landlord, consented to forego the other half. Thus, while the labourer only paid £4 in rent, he was able, by being on the spot, to come fresh to his work in the morning, instead of being weary by a walk of several miles. Mr. Cole would thus see that in some instances, at least, landlords and tenants were not unmindful of the points he had raised. He could only say he felt much indebted to Mr. Morton for a paper which would tell, not merely in that room, but upon the agricultural world at large—so clear and straightforward had been all that had fallen from him this evening. He was sure farmers would feel convinced that in proportion as they employed their intellect and capital in enhancing the productivity of the soil, so they became more valuable members of society.

Dr. ELLIS thought the great improvements in agriculture during the last 20 years were mainly attributable to the improved implements employed in cultivation. These inventions had all tended to relieve man from the more arduous portions of labour as compared with the primitive modes of agriculture. Dr. Ellis referred to the effects upon the physical condition of the labourers who excelled in their localities in mowing and reaping, the great manual exertion required for those operations tending to cripple the frame at a premature period of life. Threshing and ploughing by hand-labour were also referred to, as further instances of this; and so complete was the exhaustion of the physical energies by this arduous toil from early morning till evening, that there was little opportunity and less inclination on the part of the labourer for any efforts at mental improvement. Upon the subject of leases, Dr. Ellis stated his entire concurrence in the views expressed by Mr. Morton, and contended that unless satisfactory leases were granted to tenants neither the capital nor the intelligence necessary for successful farming would be employed in agriculture.

Mr. R. C. RANSOME said, having been engaged for

the last 16 or 17 years in the manufacture of agricultural implements, and having attended most of the exhibitions of the Royal Agricultural Society as the representative of his firm, he begged to state that all that had fallen from Mr. Morton condemnatory of the present prize system met with his fullest concurrence. He was quite sure it was not the temptation of the prizes that stimulated manufacturers to bring forward improved machinery, but the great and natural stimulus was the hope of ultimate profits from an extensive sale. With regard to the progress which agricultural machinery had made during the last 12 or 14 years, it must not be forgotten that railways had made the means of transit so much easier. The gold fields of Australia and California had been opened out, a large European population had emigrated to those regions who required to be supplied with food raised by the operations of agriculture, and these could not be carried on without the aid of machinery, which machinery could only be manufactured in England or America. Nor must it be forgotten that during that period England had become the grain market of the world, importing large quantities of corn and sending back gold for it, so that a greater demand for our machinery had been created in all the corn-growing countries of the world. These were more potent stimuli to the industry of the country than medals, diplomas, or any such trifling matters, and when he found that cottagers could gain prizes for their pigs against men who were able to feed 200 or 300 head of swine, and out of that number select the best, he would believe that the small wheelwright could beat the capitalist. He (Mr. Ransome) entirely repudiated the notions of Col. Challoner with respect to prizes on behalf of his own firm, and he believed he might do so on behalf of many other firms. It was the desire of the large implement maker to assist in bringing forward talent wherever it was found to exist, and to keep steadily on in the march of improvement, not resting upon his laurels, but always making further efforts.

Mr. ROBERT SMITH endorsed the remarks of Colonel Challoner with respect to the value of the prize system to the fullest extent, and pointed to the state of agricultural implements, as well as to the position of the makers prior to the institution of the Royal Agricultural Society, in support of that view. It was the prize system of that society which brought together a large quantity of implements to be tested as to their merits. Allusion had been made to the Bath and West of England Agricultural Society having discontinued the system of prizes. Being himself a West-of-England man, he knew the history of that matter, and he believed it had been occasioned by undue dictation on the part of some members of that society, to whom the Council gave way, and the consequence was the prizes were discontinued; but he added that a lurking fondness for the system was manifested by exhibitors of implements at the shows, for they displayed in a corner of their stalls the medals that had been awarded to them. As a member of the Council of the Royal Agricultural Society, and having closely watched its working, he considered the decision to continue the prizes for implements a judicious one. Mr. Ransome had spoken of the trade in these implements which had sprung up with our colonies. He (Mr. Smith) quite granted that, but it was only after the implements had been improved and had become of established use in our own country.

Mr. HAMMICK (Assistant Government Commissioner for the Census) would say a word on a subject not alluded to in the paper—agricultural statistics. The advantage to all classes of the community, particularly to the agricultural portion of it, of organising a good system of agricultural statistics in this country had frequently been pointed out. Mr. Morton had referred to the testimonies of competent persons as to the extent of agricultural progress in this country, but had he been able to refer to figures instead of general statements from scattered

parts of the country, he believed still more satisfactory results would have been put before them. It was quite competent for them to have a similar system to that in Ireland, where the facts were collected and recorded by public officers, forming the basis of all deductions drawn as to the state of things in that country. It was a reflection upon them that whilst France, Belgium, and other continental nations had established a complete system of agricultural statistics, nothing had been done in that direction in this country. He quite believed with Mr. Henley that the fault did not lie with the farmers themselves, for he thought they would be quite willing to give the information if the Government provided proper persons to collect it. He hoped in the next session of Parliament this subject would be taken up in a way that its importance deserved.

The CHAIRMAN said he felt it would be wanting in respect to them, and to the great subject which had brought them together, were he not to express the satisfaction he had felt at hearing the very comprehensive paper which Mr. Morton had read—a paper which was in so many points instructive, and, in so many other points, suggestive of improvements which were to follow. Agriculture had been the occupation of his life, which had not been very short or very inactive, and he rejoiced to see the interest which was taken on this occasion by the large audience gathered before him, considering, as they must do, agriculture to be the most important branch of our national industry—inasmuch as we had to look to it for supplying the means of all human existence, and, without it, no other branch of industry could long be sustained. There were very few opinions expressed in the paper with which he did not entirely concur, but, from his own experience, he could not agree with what Mr. Morton had said, when he stated he believed there was less food for cattle raised in this country than at a former period. [Mr. MORTON—Less acreage devoted to it.] His experience led him to think otherwise. In many of the mountainous districts, the facility given for the production of root crops, by the introduction of portable manures, had gone far to increase the cultivation of green crops. The system of thorough draining and deeper cultivation had brought a great proportion of land into a condition to grow wheat crops, which 40 years ago was thought only fit for a naked fallow, and would only produce a scanty crop of wheat. In this respect he was a little surprised to hear what Mr. Morton—no doubt from his experience and facts gained in other parts of the country—believed to be correct. The introduction of the portable manures had undoubtedly had great effect in extending the growth of turnips, and it was the superior cultivation of the land, by drawing from it much greater produce, and by the improvement of the various descriptions of crops, which had caused the great increase in the production of human food. One of the first things a farmer had to do was to exercise his judgment in the description of stock to which the climate and the soil in which he was located were suited, and then to bring that stock to the greatest perfection. They knew that large short-horn cattle and large sheep would be destructive to the farmer having poor land; therefore it was upon the exercise of his judgment in that respect that his success depended. Something had been said with respect to the difference between leases and tenants-at-will. In his part of the country he could say he never asked a man to farm without a lease. He should think it was doing great injustice to the tenant not to give him the security which a lease afforded, nor, as far as his experience went, would he think he was doing justice even to the owner of the land, because he believed the greatest impulse had been given to improvements where leases of considerable length were granted. No doubt, if a farm was in good condition and admitted of but small improvement, a man might go in without the security of a lease and manage it to good purpose; but if there were large improvements to be undertaken, if a man were required to lay out,

as was the case on many farms he had had to let, from £2,000 to £10,000, would it be reasonable to say, "I will not grant you a lease or give you any security for the capital you put into the land?" Although much might be said about good understandings between landlords and tenants, under which the same family had been found from age to age on the same land, he would ask, what had the public benefited by that? Did they find that great experiments were undertaken by tenants of that description? for however good might be the understanding which existed between one man and another, a Pharaoh might arise "who knew not Joseph," and the family of the tenant might not be left in the position which justice to their interests required. He had listened with some pain to the gentleman who had spoken of some instances—he hoped partial and exceptional—of great cruelty to the labouring class. That was another argument furnished in favour of leases, for in the country where he had lived and had a good deal to do with landed property, where they had leases, no tenant would take a lease unless he had sufficient houses on the farm for his labourers to live in. It had been said that the cows and pigs were better accommodated than the labourers, and that the latter had often to walk long distances to and from their work. That was so absurd and impolitic a proceeding, that he could hardly conceive a person in his senses would continue it. In the north of England and in Scotland, there were numbers of cottages for the labourers near their work, and they had them rent-free. They were built by the landlord and maintained in repair by the tenants. Of late years he had built many hundreds of cottages—not in the old style, with a single room, where whole families were herded together without comfort or decency, but with three or four rooms and all kinds of conveniences. That led to another remark. Mr. Morton had very happily and properly alluded to the superior system of education amongst agriculturists of the present day. He had, however, in a great measure confined that to the sons of farmers and occupiers of land. He (the chairman) should be glad to say one word for the labourers. It was quite obvious that the class of men accustomed to perform the operations of agriculture some years ago, could not, without superior education and skill, manage the agricultural machinery now used. It was in this view of the matter, and desiring to promote the interests of agriculture, that he would suggest that each one of them should, as far as his influence went, aid in promoting the education of the labourer,—in fact, do what he could to elevate him in character and feeling. Even as a matter of mere policy this was important, because the work required was of a more skilled character than formerly. The value of the labourer did not now depend so much upon the strength of his limbs and sinews as upon the knowledge he could bring to bear in conducting his operations. Taking a higher view, however, he would say that it was also a matter of duty on the part of the higher classes to imbue the labourer with just sentiments as well as with knowledge beneficial to him in his occupation, and to educate the young amongst this class in such a way that they would perform their duties and fulfil their position in life as accountable beings here and hereafter. He was sure he should have the hearty concurrence of the meeting in tendering their best thanks to Mr. Morton for his very excellent paper.

The vote of thanks was then passed.

The Secretary announced that on Wednesday evening next, the 16th inst. a paper by Dr. Edward Smith, F.R.S., "On the Economic Value of Foods, having special reference to the Dietary of the Labouring Classes," would be read.

## Proceedings of Institutions.

**GLASGOW ATHENAEUM.**—On the 27th of Nov., a meeting was held for the distribution of the prizes and certificates awarded by the Society of Arts. The Right Hon. the Lord-Advocate presided.—Mr. PROVAN read the report of the Athenaeum Local Board, which states that the results of the examinations conducted under their auspices since they undertook the duty in 1859, are as follows: Number of students examined by Local Board, 179; passed by them 172; appeared at Final Examination, 169; passed, 151; unsuccessful, 18; papers worked, 208; number of first-class certificates awarded, 57; second-class, 76; third-class, 52; total number of certificates, 185; total number of prizes, 20. Hugh Tennant, Esq., of Errol, has this year not only subscribed £20 for prizes, as in former years, but by personal canvass has obtained additional subscriptions for the same object to the extent of £20 16s. Mr. Tennant at the onset having indicated a wish that the prizes should be given in sums of not less than £5 each to those students who excel the most at the Society's examinations, this principle has all along been kept in view. This year, therefore, the five following students, having all obtained first-class certificates, are each entitled to a prize of £5, viz.:—John Allan, James Bennie, Dugald Bell, Alex. Morrison, and David Lawrie.—The distribution of certificates and prizes was then proceeded with, the Lord-Advocate presenting them. When Mr. John Allan's name was called, his lordship stated that that gentleman, mainly through the distinction he had acquired in connection with the Society of Arts examinations, had obtained a Government nomination. At the close of the distribution, the Lord Advocate delivered an address. After referring to the alleged failure of Mechanics' Institutes, he said:—Although the experiment did not directly answer to the intentions of the founders of Mechanics' Institutes, although they did not get quite as deep down into the soil as they expected at first, yet what an amazing stride has the national mind taken in consequence of these great institutions; how different is the social atmosphere in which we live; how different is the general intellectual cast of all classes of society; how different the hours of relaxation; how different the ideas of amusement. In referring to the benefits the Athenaeum derived from its connection with the Society of Arts, he alluded to the Prince Consort, one of the greatest benefactors of the country—one whose name will long be a household word in this land. With reference to the commonly used term, "Middle-class" Examinations, the Lord Advocate said:—I own that I do not altogether like the term of middle-class education. It offends against our old Scottish notions. In Scotland of old there was no middle-class education; there was all-class education, and the highest and the lowest sat on the same form at school and in college. The race was to the swift, whatever might be his degree. I am happy to say that the same principle still subsists in Scotland—that there is no necessary division of rank or station in the ordinary education of the land. He could not, however, but acknowledge that for such communities as this it was of the greatest possible service to have a stimulus like the present one, it was a moral engine of the strongest possible importance in such a community as this to hold out to young men an easy mode of making up the deficiencies which the strain upon their time and upon their minds had left in their ordinary education. He was happy to find that masters in this great city are fully sensible and strongly alive to the importance of the advantages held out by the Athenaeum, and that they are now shortening the time of office and work-shop labour. He alluded to the pleasure he experienced at finding females amongst the certificate holders, and concluded by congratulating

the institution on its prosperous condition. Votes of thanks were then passed.

**HERTFORD LOCAL BOARD.**—A meeting of the local board in connection with the Society of Arts was held in the Town Hall, on the 1st instant, for the distribution of the prizes and certificates. Sir Minto Farquhar, M.P., presided. The Chairman congratulated the meeting on the success which had attended the exertions of the Board, and the candidates on the zeal and assiduity which they had manifested during the past year. From his own experience he could state that if any young man who went to the metropolis in search of employment in any office could produce a certificate from the Society of Arts, or a certificate granted at the Oxford or Cambridge examinations, he would have a much better chance of success than any other competitor for the same post. The prizes and certificates were then distributed by the chairman.—The Right Hon. W. Cowper, M.P., in moving one of the resolutions, made some remarks on the progress and state of education. It was a fortunate circumstance that the arrangements which had been made of late years for educating and examining the people were met by a disposition on the part of the young men of the country to be taught and examined. He was sure that all those young men who had taken advantage of the assistance which had been placed within their reach would be glad to the last day of their lives of the exertion which they had made. Certificates, bearing testimony to the patience, the industry, and the self-control of those young men would be to them as good as the title-deeds of an estate, for they were title-deeds of those moral and mental qualities which it was a blessing to them to be able to show. As far as his observations had been able to guide him, he should say that no one had failed altogether in life who had been at the same time industrious, prudent, and conscientious. The diffusion of education was of immense importance in this country, where power was so much in the hands of the middle classes, and he thought the experience we had had of the examinations of the Society of Arts was exceedingly gratifying to all those who were labouring for the promotion of this desirable object.

## REMOVAL OF THE EXHIBITION BUILDING.

The contractors are at last vigorously at work in their preparations for removing the Exhibition Building. The timber of the floors has been taken up throughout the ground floor. The space under the Picture Galleries has been partially turned into stables. A steam-engine is at work raising the enormous scaffold necessary for taking down the domes, and this operation is being pushed on in the eastern dome, where it is expected that in a month from this time the scaffolding will be of a sufficient height to commence the removal of these structures, out of which the glass has for a long time been taken. As the work of removal proceeds the materials will be carted away to the Alexandra Park for re-erection, according to contracts which are now fully entered into. It is said that the materials of the glass courts have been sold to the London, Chatham, and Dover Railway Company.

## Fine Arts.

**SHEFFIELD SCHOOL OF ART.**—Eyre Crowe, Esq., one of the Government Inspectors of the Science and Art Department, has recently completed the annual examination at this school. Besides 70 of the students, as many as 170 pupils of public and private schools in and about Sheffield came up for examination in drawing, the results of which will not be known for three or four weeks. The Department have awarded bronze medals and honourable mentions to several students whose works were sent to London for adjudication. In future this plan will be adopted by

the Department with all schools of art; the students' works in competition for medals will have to be sent to London at a stated time every year, when the awards will be made according to a fixed standard of excellence.

**PHOTOSCULPTURE.**—References from time to time have appeared in the papers respecting this novel application of photography. Preparations are being made in Paris for carrying it out on a very extensive scale. The results are stated to be very successful. The *modus operandi* will be readily understood. The sitter or object to be sculptured is placed in the centre of a well-lighted, spacious apartment; twenty-four or even a larger number of cameras, are ranged in a circle around him, at equal distances from each other, with plates duly prepared, and by a simple mechanical arrangement the operator, by one movement of the hand simultaneously uncovers all the lenses, and after a sufficient length of exposure closes them. The plates are then developed in the usual manner, a sufficient number of operations being employed for the purpose, and proofs are subsequently printed. There are thus obtained twenty-four or more views of the subject from twenty-four or more different points of sight. Each view is then in succession, by means of a magic lantern arrangement, thrown upon a screen on an enlarged scale. In order to transfer these likenesses from the photographs to the modelling clay, an instrument on the principle of the pentagraph is then made use of, having a tracer at one end and a cutting tool at the other. The lump of modelling clay is fixed on a stand, capable of turning on its axis, with divisions corresponding to the number of photographs employed, and is placed in a position so that while the tracer of the pentagraph passes over the outline of the photograph thrown on the screen, the cutting-tool at the other end cuts the clay into the corresponding outline. The clay is then shifted one division on its axis, and the next corresponding photograph thrown on the screen, and the operation repeated, and so on in succession till the clay has the twenty-four or more outlines accurately transferred to it. It then only remains for the artist to connect these tracings or outlines on the clay, and here of course his skill is shown. The artist thus has a large amount of work mechanically and rapidly prepared for him, and he is enabled, in a comparatively short time, to execute a model combining all the truthfulness of mechanism and the skill of the artist. From this model casts in plaster, or statues in marble, can be taken in the usual way. It is stated that the sculptures thus produced are remarkably good, and can be supplied at a very cheap rate, as compared with sculpture produced entirely by hand.

## Manufactures.

**CHAIN MAKERS' STRIKE.**—An agitation has arisen among the chain makers of Cradley and the neighbourhood, with the view of obtaining an advance of wages. The men employed in this branch of trade are a very numerous body, and there are now or soon will be many hundreds of them on strike.

**BOILER EXPLOSIONS.**—The November report of the Manchester Association mentions an illustration of the importance of removing portions of mid-feather walls, in order to give an opportunity of examining the plates. On this being done at the instance of the Association, in the case of a boiler lately put under its care, the bottom, although presumed by its owner and engineer to be perfectly sound, was found to be nearly eaten through by corrosion, and on the very point of rupture. Instances continue to be met with of serious corrosion, arising from the leakage of bolted joints concealed under brickwork. All connections to boilers should be made by means of fitting blocks riveted to the shell, excepting only the attachments to the front end plate, where they are not absolutely necessary, since the plate being flat the joints

are more easily made, while at the same time, from their position, leakage, should it occur, is at once made apparent. The front end plate should be left completely open, and not, as is too frequently the case, covered in with a wall of brickwork, as leakage may thus go on undetected. Six explosions have occurred during the month, resulting in the death of eleven persons, and serious injury to eighteen others, one of the boilers in question being under the inspection of the Association.

**JUTE.**—This fibre, which a few years ago was scarcely known as an import, is now largely brought into this country, and its use is daily extending in various directions. The cotton bags which were sent from this country to South America are now nearly superseded by bags of jute, which is extensively manufactured in the north.

**WINE.**—Mr. Berthelot, who first discovered that there is a particular oxidizable principle in Bordeaux and Burgundy wines, to which he attributes their flavour, was recently induced to examine the influence which oxygen exercises over wine. He became convinced that this action is most unfavourable, and entirely destroys the bouquet, which is replaced by a most disagreeable flavour. Mr. Berthelot found it sufficient to pass a current of oxygen into the choice wines of St. Jean and Thorin to produce this result. He also demonstrated that the absorption of oxygen by wine, accelerated by the elevation of the temperature, is rendered almost immediate by the addition of an alkali. These observations prove how necessary it is to preserve wine in a perfect state from the action of the oxygen contained in the air, since the prolonged contact of 10 cubic centimetres of oxygen, that is, 50 cubic centimetres of air, is sufficient to destroy the bouquet of a quart of wine. It is the slow penetration of oxygen into bottles that Mr. Berthelot attributes the destruction of flavour which every wine experiences at last. The reason that the racking off of new wine from the vat to the cask does not produce a similar result is that new wine, being saturated with carbonic acid, disengages a portion of it when exposed to the air, so that the wine is in a great measure preserved. The decomposition of wine in bottles half full, and the diminution of the flavour, is caused by the action of oxygen. The complete destruction of the flavour of wine by the addition of an alkaline mineral water, such as that of Vichy, is explained by the preceding facts.

**ORNAMENTATION OF GLASS.**—A piece of muslin, after being stretched, is impregnated with grease, by means of a roller passed over it, and it is pressed so as to cause it to adhere to a piece of clean glass, from which it is afterwards carefully detached. The glass has thus impressed upon it the greasy lines of the lace, and, on being exposed to the fumes of fluoric acid gas, the portions unprotected by the grease are attacked by the fumes, and the result is a polished pattern on a "matted" ground. Glass thus prepared acts as a blind, preventing those who are outside from looking in, while those who are inside can readily see what is going on without.

## Commerce.

**GRAIN AND FLOUR.**—Speculators who heretofore turned their principal attention to cotton, have been purchasing flour largely in France since the harvest, and a quarter of million sacks have been purchased in Nantes, the Bristol of France, for importation to England since the harvest. The millers in the Maine and Loire, Sarthe, and other departments of France, have taken contracts for nearly all they can supply for the English market. Prices have consequently advanced fully 10 per cent. since the harvest, and are still going up. Wheat is, relatively, much cheaper than flour in France.

**SUGAR IN FRANCE.**—At present there is more excitement among dealers in this article than there has been for the last seven years; indeed, the oldest merchant cannot

recollect so rapid a rise in prices. In Nantes there are three large refineries besides several small ones; the former are the most extensive in Europe. One of them manufactures from 100 to 200 tons per day, another 70 to 80, and a third 50. The total quantity refined per day in that town is about 300 or 350 tons. During the last three years several speculators there held large stocks of raw sugar, but owing to the frequent changes made with respect to the duties, they lost immense sums of money, and, with the exception of three, who have persevered, these gentlemen have gradually diminished their stock. As a natural consequence, the failure of the beetroot crop this year in France, and the diminution of the colonial supply, have caused a very rapid rise in prices, which have been still further advanced by the fact of the stocks in the refiners' hands being smaller than usual this year. So rapid has been the upward movement, that bags containing a hundred-weight purchased at 49 francs, duty paid, six weeks since, were sold on Tuesday, the 1st instant, for 64 francs, an advance of very nearly 25 per cent. The news from Paris and Havre during the two following days stopped the rise and made the market at Nantes dull, but as the whole stock at the last named place is not more than 40,000 bags, 500 hogsheads, and 2,000 boxes, and as the refiners hold very little, it is generally expected there will be a revival in the Nantes market in a few days. About 7,000 tons have been purchased in London and Glasgow for the importers of Nantes, but as that quantity is not equal to more than three weeks' consumption, it has not a very great effect on the market. The report is that the refiners there must purchase at least 2,000 tons more in England to keep their works going until the new sugar begins to arrive from Bourbon and Mauritius. The news of the Bank of England having raised the rate of discount to 8 per cent., produced a downward tendency in the price of sugar. It is calculated that the speculators of Nantes have realized within a month from £100,000 to £150,000, in consequence of the rise in price. The last advices from the French colonies state that want of rain has caused the sugar crop to be small and late, and that scarcely any new sugar is to be expected before January or February, the greater part of that on hand being taken up for America. The falling off in the crops of Mauritius and Bourbon alone this year is estimated at 100,000 tons. The stock at Marseilles is said not to exceed 3,250 barrels from the Antilles, and 18,600 boxes from Havannah, but at the present moment there are as few buyers as sellers, and consequently the market remains stagnant.

**SILK.**—Accounts from the silk market of Aubenas, in the department of the Ardèche, state that the supply of raw silk is greater than it has been for some time. Some extensive holders having occasion for ready money, have decided to sell even at a considerable reduction of their previous demands. For example, some silk of very superior quality was lately sold at 61*fr.* the kilogramme, for which 66*fr.* was asked not long since. Silk of second quality has been sold at from 54*fr.* to 58*fr.* the kilogramme. At present the supply is greater than the demand. It is said that the silk-spinners in Lyons are not in a very prosperous condition, the preference being given to Italian spun silk, in consequence of its relative cheapness.

**COTTON IN THE RIVER PLATE.**—The Cotton Supply Association of Manchester have sent out twenty bags of cotton seed for distribution, and several cotton-growing companies have been established in Corrientes, under the auspices of the governor of that province. The Estancieros in other parts of the Argentine Republic have also sown cotton seed with the most hopeful prospects, and in Paraguay the same spirit is beginning to animate the native population. The *Buenos Ayres Standard*, in its European summary, says:—"We promise the English manufacturers 5,000 bales of cotton from the River Plate this season, and 100,000 the next. In payment for our cotton bales we do not ask for gold but for railway iron, cotton goods, coal, &c."

## Colonies.

**CORRESPONDENCE WITH THE CAPE.**—The Mail for England per "Saxon" consisted of 10,952 letters, 169 registered letters, 36 books, and 4,945 newspapers. The mail from Port Elizabeth consisted of 1,675 letters (including 55 registered), and 1,815 papers. The number of letters received from England by the last mail in Port Elizabeth was 1,200.

**WEATHER AT THE CAPE.**—Such a season as this present spring has never been known. During the winter, which set in unusually early, rain and sunshine, in most seasonable alternations, have stimulated the earth's producing powers to the utmost. There has been no reverse of any kind to mar the abundant promise. Rain and wind have both been so tempered as to insure the fullest development of the fruits of the earth, without causing damage to either the seed or the blossom. And throughout the western divisions of the colony, at any rate, the promise of corn, fruit, and wine never was fairer, though there is an appearance of the *oidium* at an earlier period than usual in some vineyards where sulphur has not been applied.

**CAPE TOWN MECHANICS' INSTITUTION.**—The last report says that notwithstanding the unprecedented depression that has existed, affecting business and trade generally, the Institution has still retained the favourable position mentioned in last year's report, the amount of subscriptions received during the two winter quarters of 1862 being £18 5*s.*, and for the two quarters just ended £20 14*s.* Notwithstanding the large increase in the income of the year, the committee regret having to report a considerable increase in the liabilities of the Institution. This has principally occurred through the subscriptions being about £20 below the working expenses of the Institution, and the great decrease in the receipts of admission to the lectures, several of which were delivered during the past winter session: one by E. L. Layard, Esq., "A Trip to New Zealand with Sir George Grey;" one by Rev. W. Thompson, "A brief Review of the Writings commonly attributed to Moses, and the conclusion to which it leads;" one by Mr. T. Walter, on "Astronomy," and many others. During the past six months upwards of seven hundred volumes of books, and nearly five hundred periodicals, have been taken out for perusal by the members.

## Publications Issued.

**CHEMICAL TECHNOLOGY**, or Chemistry in its application to the Arts and Manufactures; by Dr. Thomas Richardson, and Henry Watts, F.C.S. (*H. Bailliere*.) The two first parts of this work, illustrated by upwards of 400 engravings, contain descriptions of the mode of preparation and uses of fuel of all sorts. Part 3, just out, is on acids, alkalis, and salts, their manufacture and application. This portion of the work contains articles on potash, soda, soap, railway grease, &c., with detailed descriptions of the most approved modes of manufacture, and is illustrated by numerous wood engravings.

**ELEMENTARY TREATISE ON PHYSICS**, by Professor Ganot, translated by E. Atkinson, F.C.S. (*H. Bailliere*.) The subjects treated of are matter, force, motion, gravitation, liquids, gases, acoustics, heat, light, magnetism, and electricity, with outlines of meteorology and climatology; the work is illustrated by nearly 600 engravings.

**A TREATISE ON SUGAR MACHINERY**; including the Process of producing Sugar from the Cane; refining moist and loaf Sugar, home and colonial. The mode of designing, manufacturing, and erecting the Machinery; together with Rules for the proportions and Estimates. Illustrated by four single and twelve large folding plates. By N. P. Burgh, Engineer. Royal 4to., price 30*s.* (*E. and F. N. Spon.*)

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*Forthcoming Publications.*

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CYCLOPÆDIA OF USEFUL ARTS, Mechanical and Chemical, Manufactures, Mining, and Engineering, illustrated by upwards of 2,500 engravings; edited by Charles Tomlinson, lecturer on science, King's College School, London. (*Virtue.*) A new edition of this cyclopædia is about to be published in about 27 parts at two shillings each, imperial 8vo. In the original prospectus, the editor stated that he had attempted to convey to his readers, not a mere sketch of what is to be seen at the surface of our manufactures, but a comprehensive account of the processes of the useful arts, in connection with the scientific principles on which they are based, and he did not attempt to make his descriptions appear easy by the omission of those details which, however difficult to explain in popular language, are yet of great importance. In this new edition the whole work will be carefully revised, corrected, and harmonised, and the progress of the useful arts during the time which has elapsed since the completion of the original edition will be given in alphabetical order in an appendix to which reference will be made in the body of the work.

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THE LATE STORMS IN FRANCE.—The tempest which has raged on both sides of the Channel has done immense damage in France. On the 3rd instant, the state of the Loire was terrible, the wind attained a velocity of more than seventy miles an hour, the river was in such a condition that no small boat could swim, and all the lighters were driven on shore. Ten fatal accidents happened in the streets of Nantes from the falling of chimneys, tiles, and slates. A telegram received in the above named town on the 4th instant, announced the loss of no less than twelve coasting vessels in the Bay of Camaret. But one of the most lamentable accidents occurred at Cherbourg, on Wednesday, the 2nd instant, at three in the morning. The *Argus*, a trading vessel from Granville, was thrown on the north-west point of the Island of l'Éléée. The weather was frightful. The cries of the crew of the *Argus* were heard, and the commander of the iron-plated frigate *La Couronne*, lying in the harbour, sent his barge, manned by eighteen choice seamen, to the aid of the crew of the unfortunate *Argus*, which after great exertions was got off. The port officer, seeing the danger of both ship and boat, sent a small steamer to tow them into the harbour, but at 8 a.m. the wind suddenly became furious, the tow ropes were broken, and the *Argus* and the boat of the *Couronne* cast adrift, and the latter, being carried by the wind towards Cape Teir, was thrown on the rocks of Fermanville and every soul on board her perished. Three of the boat's crew had been put on board of the *Argus*, and the loss was thereby reduced to sixteen. One account states that the whole of the crew of the *Argus* were saved except the captain; but a short account given in the *Moniteur* states the number of lives lost by this lamentable catastrophe to be thirty-two. At Toulon the roof of the theatre was stripped entirely off by the violence of the wind.

PRINCE CONSORT MEMORIAL.—Mr. William Jackson, M.P., has determined to erect at Birkenhead, as a memorial to the Prince Consort, not a simple monument, but industrial ragged schools, at a cost, including the site, of £7,000. The institution is to be called "The Albert Refuge."

SOUTH LONDON WORKING MEN'S INDUSTRIAL EXHIBITION.—It has been determined to open the exhibition on the 1st of March next, and that the classification of articles should be:—1. Useful; 2. Ingenious; 3. Ornamental;

4. Scientific; 5. Artistic; 6. Literary; 7. Amusing; 8. Curious; 9. Miscellaneous. It has also been agreed to adopt the recommendation of the working men's meeting in reference to a small charge being made for admission, and that the exhibition should remain open for one week. Several applications for space have already been made by working men.

THAMES EMBANKMENT.—The first foundation piles are being driven opposite the late residence of the Duke of Buccleuch. Operations have also been commenced for the embankment on the southern side, which will be carried out simultaneously with that on the Middlesex side.

Mechanics' INSTITUTION AT BOMBAY.—Mr. David Sassoon, a merchant in Bombay, has offered the sum of £6,000, on condition of government giving an equal sum and a site, for the erection of a suitable building for the Mechanics' Institution and for public meetings.

RAILWAY BREAK.—Experiments have been made on the Entre-Sambre-et-Meuse Railway, in Belgium, to test the efficacy of a new break, the invention of a lady, Mdlle. Micas. The principle of the invention consists in the sudden application of a sort of wooden skate or wedge to the wheel, whereby it is raised a millimetre or two. From that moment the rapidity of the train is checked. The action on the break is transmitted by a single man pressing upon a rod connected with the wedge, and without the aid of a screw. The engineer of the Government railways in Belgium directed the experiments, and many other Belgian and foreign engineers were present. A train, weighing 185,000 kilogrammes, was allowed to descend a gradient of 14 millimetres per metre by its own weight, and without the aid of an engine. Two breaks being used, the train was stopped, in a space of 300 metres, while going at a speed of 36 kilometres (22½ miles). In another experiment a train was drawn by a 16-inch engine, with four coupled wheels, along a level railway, and at the full speed of 55 kilometres (34 miles) per hour, a single break stopped the train within the space of 400 metres. With two breaks the stoppage was obtained within the space of 175 metres; and at a speed of 60 kilometres (38 miles) per hour, the stoppage was effected within a space of 165 metres only.

LOCOMOTION.—A correspondent writes:—A great want of the present day is a cheap mode of locomotion for one or more persons, corresponding to the gig or dog-cart, but independent of animal power; and probably, if the attention of inventors were drawn to the subject by an offer of the Society of Arts medal, the want might be supplied. The original cost of the article is not so much an object as the continued cost of the motive power, and the getting rid of the trouble and annoyance associated with draught animals. Besides, when such an article is brought into use there will be a tendency to economy of construction, and it may be hoped that, eventually, even the costermonger's donkey may become a mere tradition.

TRANSMISSION OF PATTERNS BY POST.—To a recent memorial from the Bradford Chamber of Commerce on the subject of the charges upon patterns by post, the Postmaster-General has replied that, with regard to the inland postal scale, there is reason to fear that the department already sustains some loss by the inland book post, and that he does not feel justified, under these circumstances, in adopting the same rate of charges for the pattern post, and thus incurring the risk of further loss. The charge is now three times the book rate. As to the transmission of patterns abroad, he states that arrangements have already been made with the Italian and Canadian Post offices for the transmission of patterns at a moderate rate, and that the measure in each case is appointed to come into operation on the 1st of January, 1864. Negotiations have also been entered into for the establishment of a pattern post between this country and the German Postal Union, Belgium, India, and the Cape of Good Hope, and similar negotiations are in contemplation with other foreign countries, and with all the British colonies.

## Correspondence.

**ELECTRIC REGULATORS.**—SIR,—In reply to the observations made by Dr. Bachhoffner, at the meeting on the 2nd instant, with reference to the spring in Mr. Holmes's lamp being objectionable, may I be allowed to say it is simply used as a counterpoise to a slight catch, and not as a motive power, that being provided for in the difference of gravity between the two carbon holders, and therefore the idea that a mainspring is used to move the various parts (as in most other lamps), and which he thought so highly objectionable, is entirely without foundation. Having had, perhaps, as much experience in the working of different kinds of electric lamps as any one in London, I have no hesitation in saying that Mr. Holmes's is the most perfect, as it will burn more than three hours without a flicker—the carbons then require renewing. In reference to the letter by Mr. S. Highley, in last week's *Journal*, in which he speaks of "the trial of electric lamps" at the Polytechnic, I beg to say that no competitive trial took place, and that I did not have a lamp there of my own manufacture. I was engaged part of the time giving a lecture (on spectrum analysis) in the small theatre, where I used a lamp of Duboscq's make, after which I had an opportunity of observing the light from those in the hall, and could not help noticing the unsteadiness of the one referred to in Mr. Highley's letter.—I am, &c.,  
W. LADD.  
11 and 12, Beaconsfield, Regent-street, W.

## MEETINGS FOR THE ENSUING WEEK.

**MON.** ...R. Geographical, 8<sup>th</sup>. 1. Mr. Robt. Swinhoe, "On Formosa."  
2. Mr. F. A. Eaton, "Journey from Nazareth to Bozrah-Moab, and thence to Damascus."  
British Architects, 8.  
Medical, 8<sup>th</sup>. Mr. J. Baker Brown, "On the Treatment of Hypertrophy and Ulceration of the Os Uteri."  
**TUES.** ...Civil Engineers, 8. Annual General Meeting.  
Statistical, 8. 1. Professor Rogers, "On the continuous Price of Wheat for 102 Years (1380-1481)." 2. The President, "On Sumptuary Statistics (1506-1863).  
Pathological, 8.  
Syro-Egyptian, 7<sup>th</sup>.  
Anthropological, 8.  
**WED.** ...Society of Arts, 8. Dr. Edward Smith, F.R.S., "On the Economic Value of Foods, having special reference to the Dietary of the Labouring Classes."  
Geological, 8. 1. Rev. Prof. S. Haughton, M.A., "On the Granites and Syenites of Donegal, &c." 2. "Letters relating to Recent Discoveries of Fossil Reptiles in Central India." By the late Rev. S. Hislop. Communicated by Prof. T. R. Jones. 3. Mr. J. W. Farren, "Letters relating to the Recent Earthquake at Manila." Communicated by Sir R. I. Murchison. 4. Mr. W. Vicary, "On the Pebble-bed of Budleigh Salterton," with Notes on the Fossils by Mr. J. W. Salter.  
London Inst. 7.  
**THUR.** ...Royal, 8<sup>th</sup>.  
Antiquaries, 8.  
Linnean, 8.  
Chemical, 8.  
Philosophical Club, 6.  
**FRI.** ...Philological, 8.

## Patents.

From Commissioners of Patents Journal, December 4th.

## GRANTS OF PROVISIONAL PROTECTION.

Agricultural engines and boilers—2858—R. A. Brooman.  
Amalgamating the precious metals—2819—W. E. Gedde.  
Armour for ships, &c.—2848—T. S. Prideaux.  
Barometers, gas regulators, &c.—2383—J. Bailey, G. W. Blake, and W. H. Bailey.  
Boats, towing—2872—J. J. Maurer.  
Cartridges—2888—W. Wigfall and G. Jolly.  
Cartridges—2870—G. T. Bousfield.  
Chopping animal and vegetable substances—2832—W. F. Dearlove.  
Coal, &c., distilling—2812—A. Craig.  
Coal and peat, distillation of—2886—W. M. Williams.  
Cotton gins—2844—J. C. Wilson.  
Dyeing colours—2894—H. Hirzel.  
Filters—2874—C. W. Harrison.  
Fire-arms, breech-loading, &c.—2883—R. Mayer.  
Gas meters—2878—W. Cowan.

Iron and steel—2852—W. E. Newton.  
Labels on bottles, &c.—2869—A. P. Henry and R. T. Power.  
Looms—2834—J. W. Drummond.  
Looms—2838—M. A. Muir and J. McIlwain.  
Omnibus passenger recording apparatus—2514—A. Crellin.  
Ordnance and small arms—2876—P. M. Parsons.  
Ores, pulverising—2864—C. Pengelly.  
Paper spools or tubes used in spinning machines—2860—T. William and I. Naylor.  
Poisons, prevention of accidents from—2866—G. Thonger.  
Postal envelope for patterns, &c.—2709—T. Adams and J. Scott.  
Printing presses—2856—R. A. Brooman.  
Railway brakes—2557—L. Eynard.  
Railway waggons—2632—A. Potter and W. P. Potter.  
Railways, atmospheric—2830—G. Remington.  
Rollers for blinds, maps, &c.—2836—G. T. Bousfield.  
Rudders—2854—J. Lewis.  
Sewing machines—2842—J. P. Binns.  
Ships, sheathing—2880—J. Bettleby.  
Ships, propelling—2863—R. Griffiths.  
Ships, and machinery for propelling them—2288—C. H. Chadburn and W. J. Triastam.  
Ships, fastening together the parts of, and caulking—2756—R. Saunders.  
Shuttles—2816—H. Holden.  
Silk, machinery for doubling, twisting, &c.—2810—B. A. Murray.  
Spinning machinery—2617—J. Ronald.  
Spinning and doubling machinery—2828—W. Robertson.  
Starches, coloring—2839—J. Medway and S. Joyce.  
Steam boilers—2890—J. Stewart.  
Steam generator—2822—L. E. C. Martin.  
Taps—2716—J. Macintosh.  
Telegraph cables—2826—C. W. Siemens.  
Umbrella covers—2850—W. A. Lytle.  
Waterclosets—2835—G. K. Gevelin.

## INVENTION WITH COMPLETE SPECIFICATION FILED.

Fire-arms—2998—M. R. Pilon.

## PATENTS SEALED.

1407. W. A. Brown.	1489. S. S. Robson.
1410. C. E. Newcomen.	1492. J. Forrester.
1412. N. Walton.	1530. R. Jobson.
1415. W. Clark.	1531. J. L. Clarke.
1419. W. E. Gedde.	1555. W. L. and T. Winans.
1423. H. Reynell.	1556. W. L. and T. Winans.
1426. J. Petrie.	1557. W. L. and T. Winans.
1442. W. Roberts.	1558. W. L. and T. Winans.
1450. T. M. Harrison.	1565. W. Snell.
1451. M. Henry.	1573. W. E. Newton.
1455. C. L. V. Tenac.	1773. M. Henry.
1465. F. A. and F. Calvert.	1776. D. C. G. Clemm.
1466. G. Davies.	2041. R. Baillie.
1477. J. Jones.	2129. C. Harratt.
1479. T. Wrigley.	2228. E. Oliver and G. Myers.

From Commissioners of Patents Journal, December 8th.

## PATENTS SEALED.

1443. T. Adams.	1502. F. S. Williams.
1446. T. Evans and E. Hughes.	1509. A. J. Fraser.
1470. G. Bedson.	1570. W. L. and T. Winans.
1471. T. C. March.	1571. W. L. and T. Winans.
1473. R. Hughes.	1572. W. L. and T. Winans.
1480. J. Hopkinson.	1589. S. Knowles & R. Hayward.
1483. T. A. Elliott.	1593. S. Smith.
1486. M. B. Westhead.	1651. J. King.
1488. H. G. W. Wagstaff.	1666. H. A. Bonneville.
1490. J. Shand.	2245. M. Gerstenhofer.
1501. J. J. Sheldon.	2546. J. H. Johnson.

## PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

2947. A. Jackson.	3030. R. Mushet.
3009. J. Robson, jun.	2980. C. S. Duncan.
2959. W. Pilkington.	3017. D. Annan.
2963. E. T. Hughes.	3138. J. Chatterton and W. Smith.
2960. W. and J. Galloway.	3143. J. Jobson.
2982. C. W. Siemens.	3045. R. Mushet.
2985. E. Morewood.	3070. R. Mushet.

## PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

2861. F. Siemens.	2915. T. Vicars, sen., T. Vicars, jun., T. Ashmore, and J. Smith.
2867. A. and W. Bullough.	
2874. J. Apperly and W. Clissold.	
2884. D. Crawford.	
2894. W. H. Bowers.	2916. T. Peake.
	2936. T. and W. Wheatley.

## REGISTERED DESIGNS.

Parasol, dome of—4599—Nov. 27—T. Evans, 17, Pentonville-road, N.  
Scarf Ring (the Eclipse)—4600—Dec. 1—W. Lewis, 13, Cheapside.  
Rack Pulley—4601—Dec. 4—J. Collins, Birmingham.  
Lamp—4602—Dec. 5—J. E. Gardner, Strand, W.C.  
Vermin Trap—4603—Dec. 7—C. Pullinger, Selsley, near Chichester.